

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

*Technical Memorandum 33-736*

*Volume III*

*Mission Design Data for Venus, Mars, and  
Jupiter Through 1990*

*Andrey B. Sergeyevsky*

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VENUS, MARS, AND JUPITER THROUGH 1990,  
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**JET PROPULSION LABORATORY  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
PASADENA, CALIFORNIA**

September 1, 1975

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## **PREFACE**

**This document is divided into three volumes. Volume I comprises the mission design data for Venus, Volume II the data for Mars, and Volume III the data for Jupiter.**



## TABLE OF CONTENTS

A.	INTRODUCTION . . . . .	1-1
B.	DESCRIPTION OF TRAJECTORY DATA . . . . .	1-1
C.	DESCRIPTION OF PLANETARY POSITIONAL DATA . . . . .	1-3
	REFERENCES . . . . .	1-5

## LIST OF FIGURES

1.	Definition of B-Plane . . . . .	1-4
2.	Definition of Cone and Clock Angle . . . . .	1-4
	Contours of $C_3$ and Flight Times, VHP, DLA, ZAL, INC, ZAP, ETS, LVI, ZAE, ETE, THA, SG1, SG2, and SG3 for Earth to Jupiter Missions Launched in 1977, 1978, 1979, 1980-81, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990 . . . . .	4-1 through 4-182
	Jupiter Positional Data for the Years 1975 to 1995 . . . . .	4-183 through 4-330



# MISSION DESIGN DATA FOR VENUS, MARS AND JUPITER THROUGH 1990

Andrey B. Sergeyevsky

## A. INTRODUCTION

This document presents mission design data for direct transfer trajectories from Earth to three planets – Venus, Mars and Jupiter, extending previously published information (see Refs. 1, 2, 3, 4 and 5) through the 1990 departure opportunity.

The primary purpose of this effort is to provide the mission analyst with graphical information, sufficient for preliminary mission design and evaluation. The data follows closely the format of Reference 4 and reflects methods of Reference 2. A specially modified version of the Space Research Conic Program (SPARC) (see Ref. 6) was used to generate the trajectory information presented. The data were automatically contour-plotted on the SC4020 plotter using the General Plot Program (GPP) (see Ref. 7), then hand-retouched and labeled. A special program (VIEWPE) was constructed to provide planetary positional data in graphical form, plotted on the SC4020, and presented in original format.

The data are arranged in three sections by arrival planet, in natural sequence. Each section consists of two parts – the trajectory characteristics for all available opportunities to the particular planet, in chronological order, followed by that planet's positional data for every calendar year, from 1975 to 1995.

The persevering and encouraging insistence of management, especially that of Mr. Willard E. Bollman to carry this effort through to completion, as well as the graphic and editorial support of Mr. Richard W. Rackus are gratefully acknowledged.

## B. DESCRIPTION OF TRAJECTORY CHARACTERISTICS DATA

### 1. General

The data represent trajectory performance information plotted in the departure date/arrival date space, thus

defining all possible transfer trajectories between the two bodies, within the time-span considered. Fourteen individual parameters are contour-plotted on the departure energy ( $C_3$ ) background contour chart, for each opportunity. The following opportunities are presented:

To Venus: 1975, 1976/7, 1978, 1980, 1981, 1983, 1984/5, 1986, 1988, 1989/90.

To Mars: 1979, 1981/2, 1983/4, 1985/6, 1988, 1990.

To Jupiter: 1977, 1978, 1979, 1980/81, 1981/82, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990.

### 2. Definition of Terms

The following parameters are displayed on the contour plots:

$C_3$  Earth departure energy ( $\text{km}^2/\text{sec}^2$ ); same as the square of departure hyperbolic excess velocity  $V_\infty^2 = C_3 = V_I^2 - 2GM/R_I$ , where

$V_I$  = conic injection velocity (km/sec)

$GM$  = gravitational constant times mass of the attracting body, from Reference 8:

$GM_{\text{VENUS}} = 0.32486010\text{E}6$   
( $\text{km}^3/\text{sec}^2$ )

$GM_{\text{EARTH}} = 0.39860115\text{E}6$

$GM_{\text{MARS}} = 0.42828444\text{E}5$

$GM_{\text{JUPITER}} = 0.12670772\text{E}9$

$R_I$	$= R_S + h_I$ , Injection radius (km), sum of surface radius $R_{S\text{PLANET}}$ and injection altitude $h_I$ , where (see Ref. 8):	DLA	Geocentric declination (vs. mean Earth equator of launch date) of the departure $V_\infty$ - vector. May impose launch constraints. (deg)
$R_{S\text{VENUS}}$	$= 6052$ (km)	ZAL	Angle between departure $V_\infty$ vector and Sun-Earth vector. Equivalent to Earth-probe-Sun angle, several days out. (deg)
$R_{S\text{EARTH}}$	$= 6378.16$	INC	Heliocentric inclination of transfer trajectory with mean ecliptic (Earth orbital) plane of launch date. (deg)
$R_{S\text{MARS}}$	$= 3393.4$	ZAP	Angle between arrival $V_\infty$ vector and the arrival planet-to-Sun vector. Equivalent to planet-probe-Sun angle at far encounter; for subsolar impact would be equal to $180^\circ$ (deg).
$R_{S\text{JUPITER}}$	$= 71372$	ETS	Angle in arrival B-plane, measured from T-axis, clockwise, to projection of Sun-to-planet vector. Equivalent to solar occultation region center-line. (deg)
TF	Time of flight (Days)	LV1	Planetocentric latitude of vertical impact vs arrival planet equator. Note that Venusian north is below ecliptic, while Mars' and Jupiter's is above. Equivalent to declination of the incoming asymptote (i.e., the negative of incoming $V_\infty$ vector) in planetary equator system.
CD	Earth to planet communication distance at arrival (km)	ZAE	Angle between arrival $V_\infty$ vector and the planet-to-Earth vector. Equivalent to planet-probe-Earth angle at far encounter. (Deg.)
VHP	Arrival hyperbolic excess velocity  $V_\infty = \sqrt{V^2 - \frac{2GM}{R}}$ , (km/sec),  where $V$ = Heliocentric conic arrival velocity at heliocentric radius $R$ (km).  Arrival Planet Orbit insertion velocity increment $\Delta V$ , at periape, may be computed from $V_\infty$ :  $\Delta V = \sqrt{V_\infty^2 + \frac{GM}{R_p}} - \sqrt{\frac{2GM R_A}{R_p(R_A + R_p)}}$  where $R_p$ and $R_A$ are planetocentric periape and apoapse radii (km), respectively. Similarly, if specific capture orbit period $P$ (sec) and periape radius $R_p$ are desired:  $\Delta V = \sqrt{V^2 + \frac{2GM}{R_p}} - \sqrt{\frac{2GM}{R_p} - 3\left(\frac{2GM\pi}{P}\right)^2}$	ETE	Angle in arrival B-plane, measured from T-axis, clockwise, to projection of Earth-to-planet vector. Equivalent to Earth occultation region centerline. (deg)
B-PLANE	A plane normal to the incoming $V_\infty$ - vector and passing through the center of planet.	THA	Angle in arrival B-plane, from T-axis, clockwise, to major axis of error dispersion ellipse (0 - 180 deg).
T-AXIS	Axis in B-plane, parallel to ecliptic (Earth mean orbital) plane (see Figure 1).	SG1	Semi-major axis magnitude of B-plane dispersion ellipse, resulting from a spherically distributed $V_\infty$ velocity vector error of 0.1 m/sec on departure asymptote (km).
		SG2	Semi-minor axis of above dispersion eclipse (km).

SG3      Arrival time dispersion, normal to B-plane,  
for above error model (sec).

YR/M/D    Year, Month, Date.

## C. DESCRIPTION OF PLANETARY POSITIONAL DATA

### 1. General

The data represent planetary geometry-related information plotted versus calendar arrival date at the target planet. Each set of seven plots represents the annual time history of 19 parameters, and may be used for flyby and orbiter missions.

### 2. Description of Curve Labels

P	Target planet, equivalent to probe approaching or in orbit about target planet.
E	Earth
S	Sun
CA	Cone Angle, i.e., Sun-probe-object (Earth or Canopus, etc.) angle. (See Figure 2.)
KA	Clock Angle, i.e., angle between projections of the Probe-Canopus and probe-object vectors into the plane normal to the sun-line (for which CA = 90°). (See Figure 2.)
RISEXX	Rise time (GMT) of planet through 6° horizon mask at DSN Station No. XX. (e.g., XX = 14 = GOLDSTONE, 43 = CANBERRA, 63 = MADRID.)
SETXX	Set time (GMT) of planet through 6° horizon mask at DSN Station No. XX.

### 3. Description of Plots

Plot	Y-axis label
a)	DECLIN      Geocentric Earth equatorial declination of planet (P), planetocentric planetary equatorial declination of Earth (E) and Sun (S). Note that Venusian north is below ecliptic.
b)	EC.LON      Heliocentric ecliptic longitude of planet.
c)	CA,KA      Cone (ECA) and Clock (EKA) angle of Earth and cone angle of Canopus (CCA) as seen from a Sun-Canopus oriented spacecraft near target planet, P (see Figure 2).
d)	DISTANCE    Sun-Planet distance (SP) and Earth-Planet communication distance (EP) in mill. km.
e)	SUN-EARTH-PLANET    Sun-Earth-Planet angle (SEP), indicating times of superior (SEP ≈ 0) and inferior (SEP ≈ 180°) conjunction; SEP > 5° is a communications constraint.
f)	STATION RISE/SET    Rise and Set times (GMT) of planet at 3 DSN Stations on Earth, 6° mask.

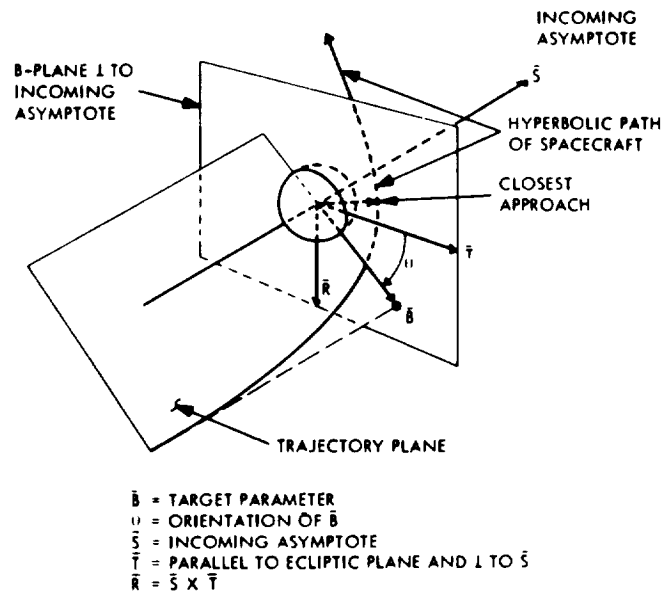


Figure 1. Definition of B-Plane

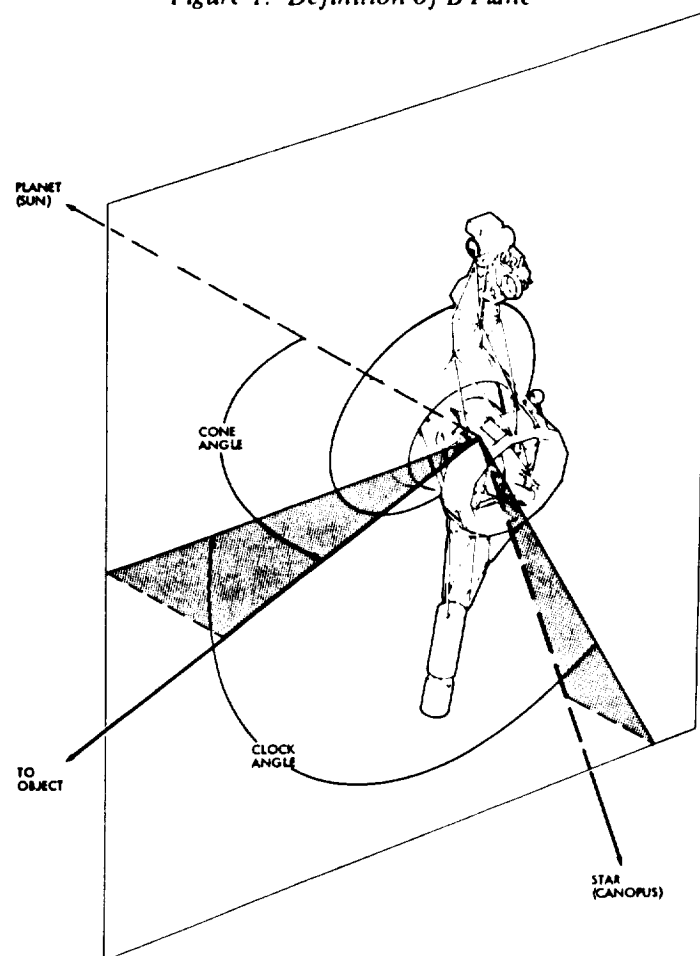


Figure 2. Definition of Cone and Clock Angle



## REFERENCES

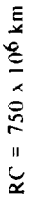
1. Clarke, V. C., Jr., Bollman, W. E., Roth, R. T., Scholey, W. J., "Design Parameters for Ballistic Interplanetary Trajectories Part I. One-way Transfers to Mars and Venus," JPL TR 32-77, January 1963.
2. Clarke, V. C., Jr., Bollman, W. E., Feritis, P. H., Roth, R. Y., "Design Parameters for Ballistic Interplanetary Trajectories Part II. One-way Transfers to Mercury and Jupiter," JPL TR 32-77, January 1966.
3. Richards, R. J., Roth, R. Y., "Earth-Mars Trajectories," JPL TM 33-100, June 1965.
4. Kohlase, C. E., Bollman, W. E., "Trajectory Selection Considerations for Voyager Missions to Mars During the 1971-1977 Time Period," JPL TM 33-210, September 1965.
5. Wallace, R. A., "Trajectory Considerations for a Mission to Jupiter in 1972," JPL TM 33-375, March 1968.
6. Roth, R., Zorian, M. D., "Space Research Conic Program, Phase III," JPL 900-130, Rev. A, May 1969.\*
7. "General Plot Program," JPL 900-341, Anon., May 1970.\*
8. Melbourne, W. G., Mulholland, T. D., Sjogren, W. L., Sturms, F. M., Jr., "Constants and Related Information for Astrodynamical Calculations, 1968," JPL TR 32-1306, July 1968.

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\*JPL Internal Document

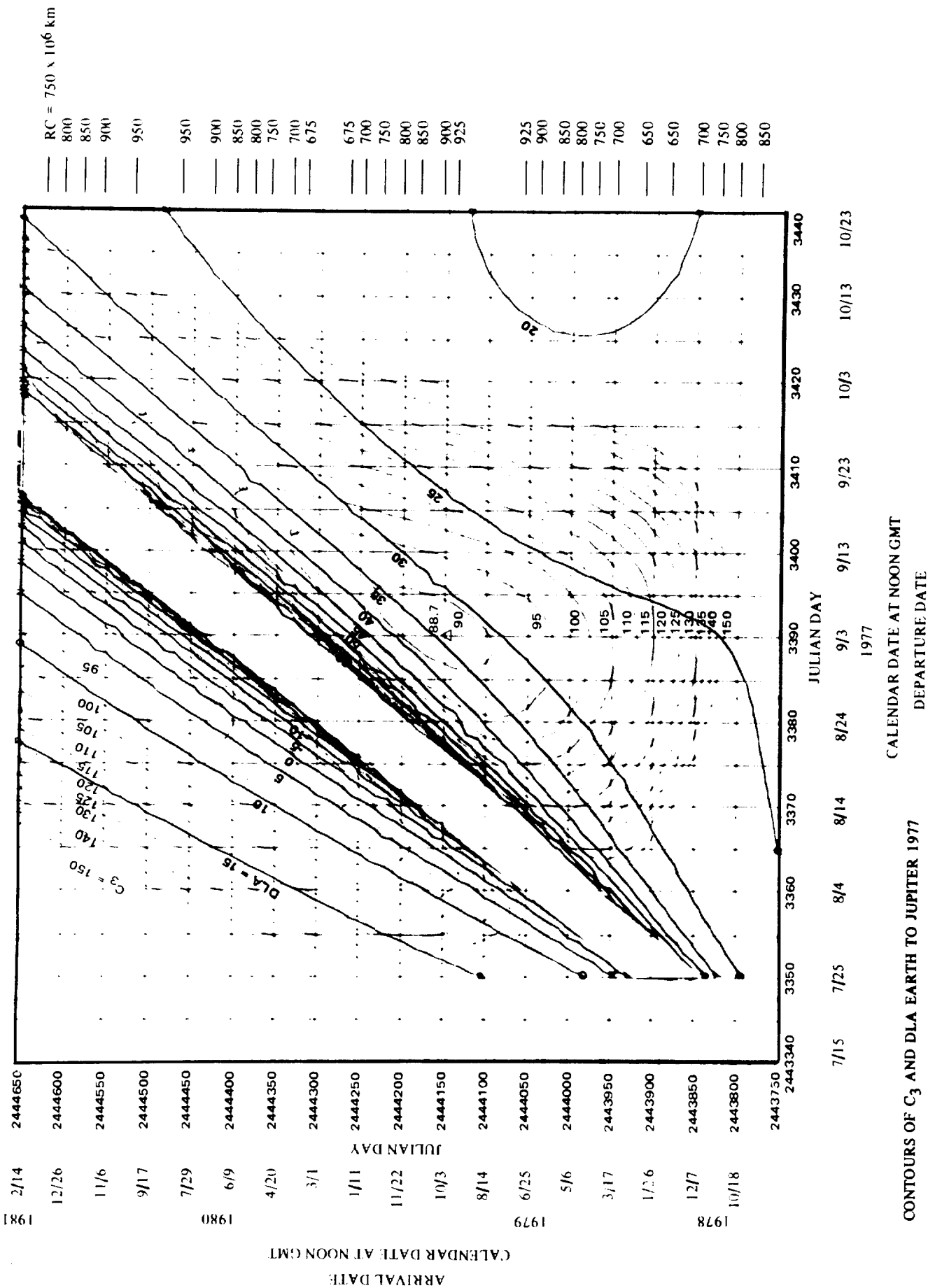


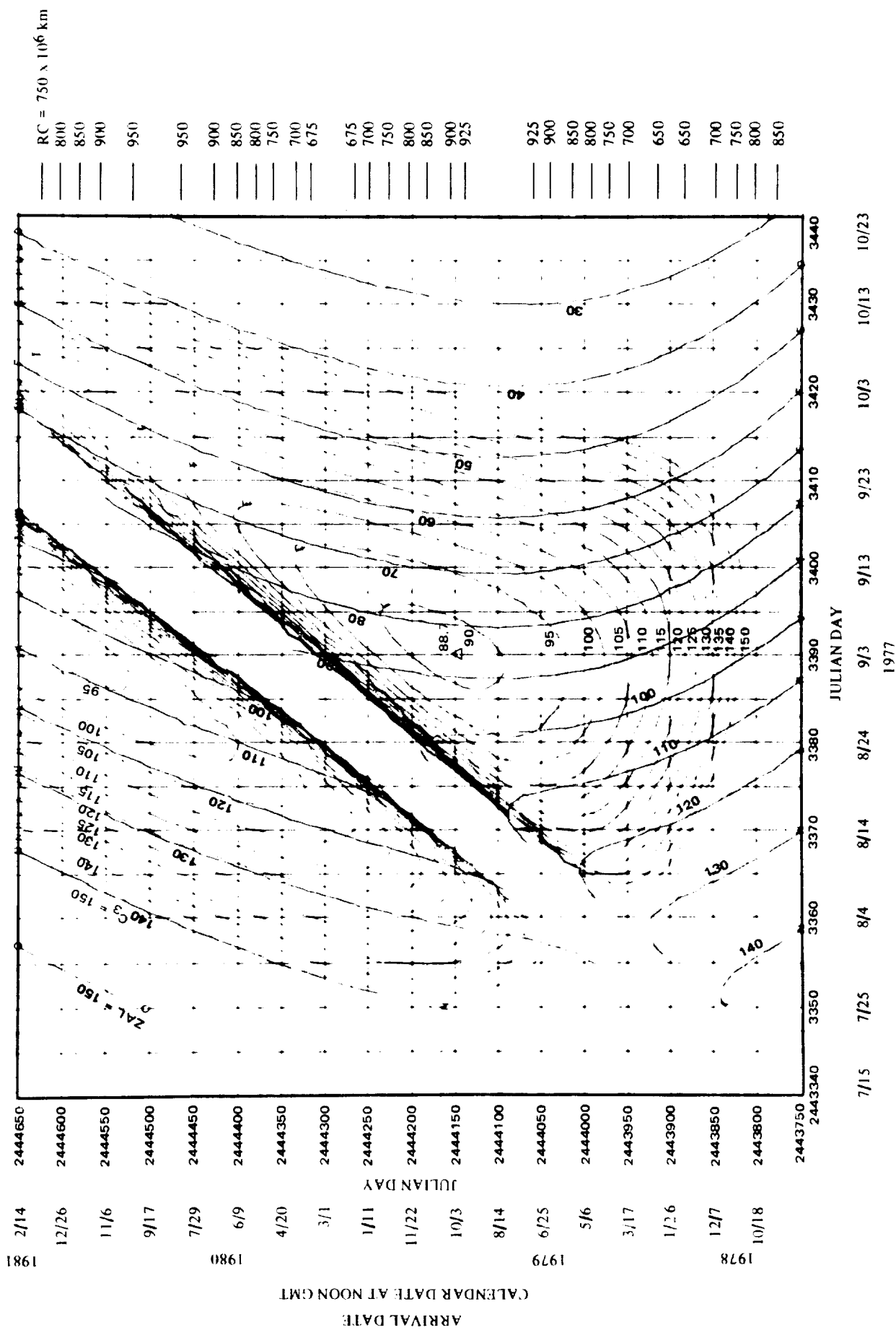




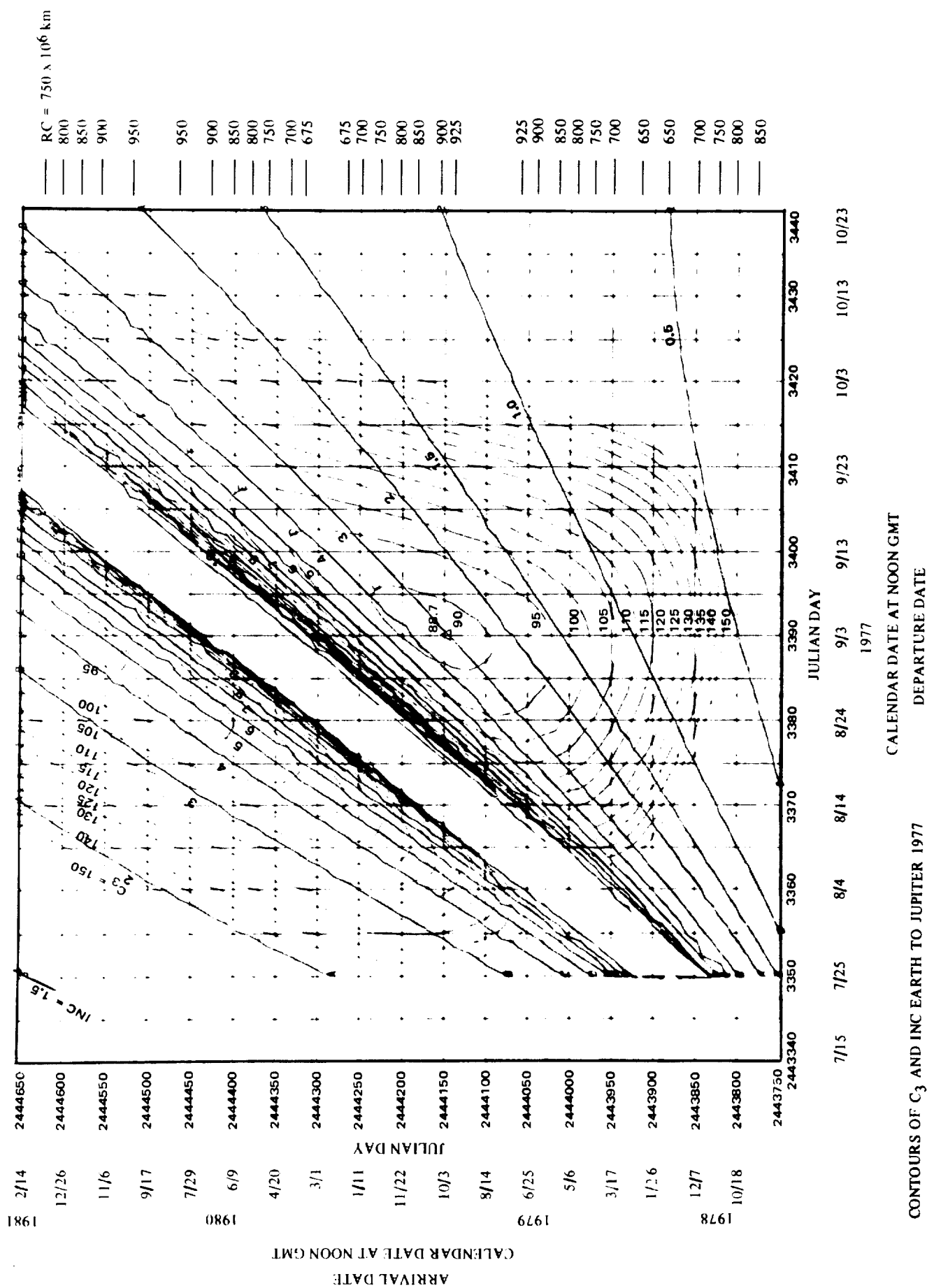
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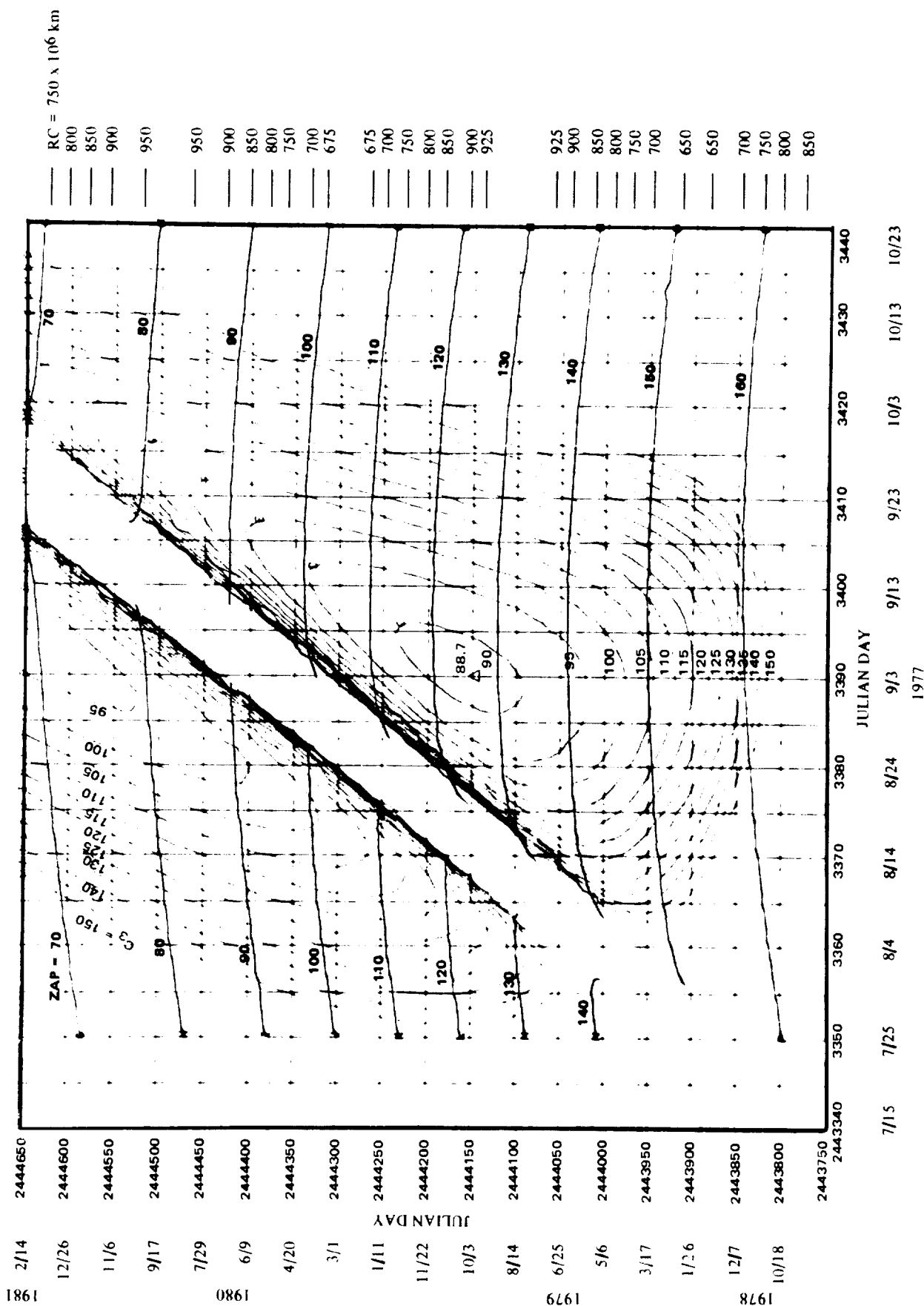
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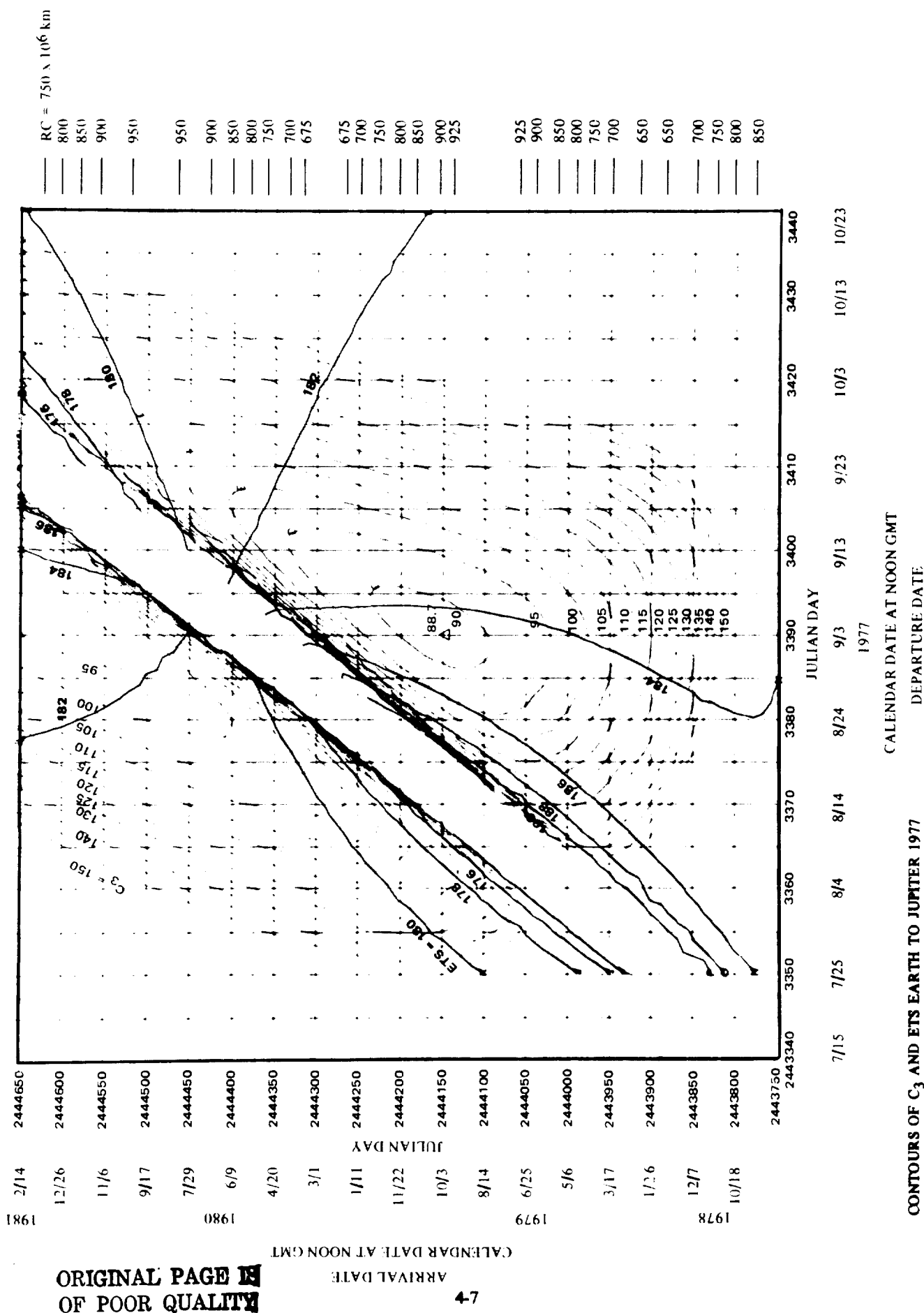




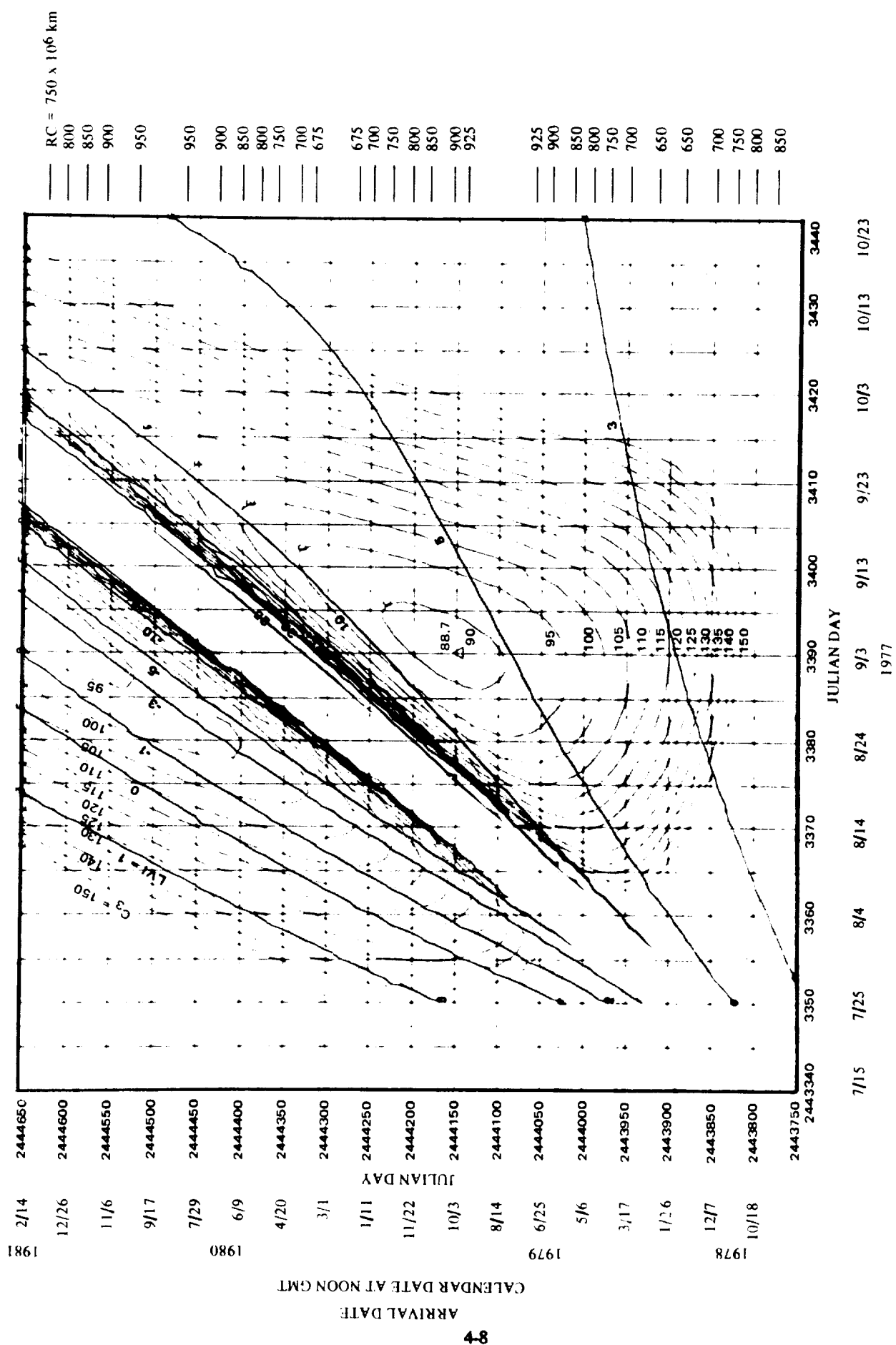
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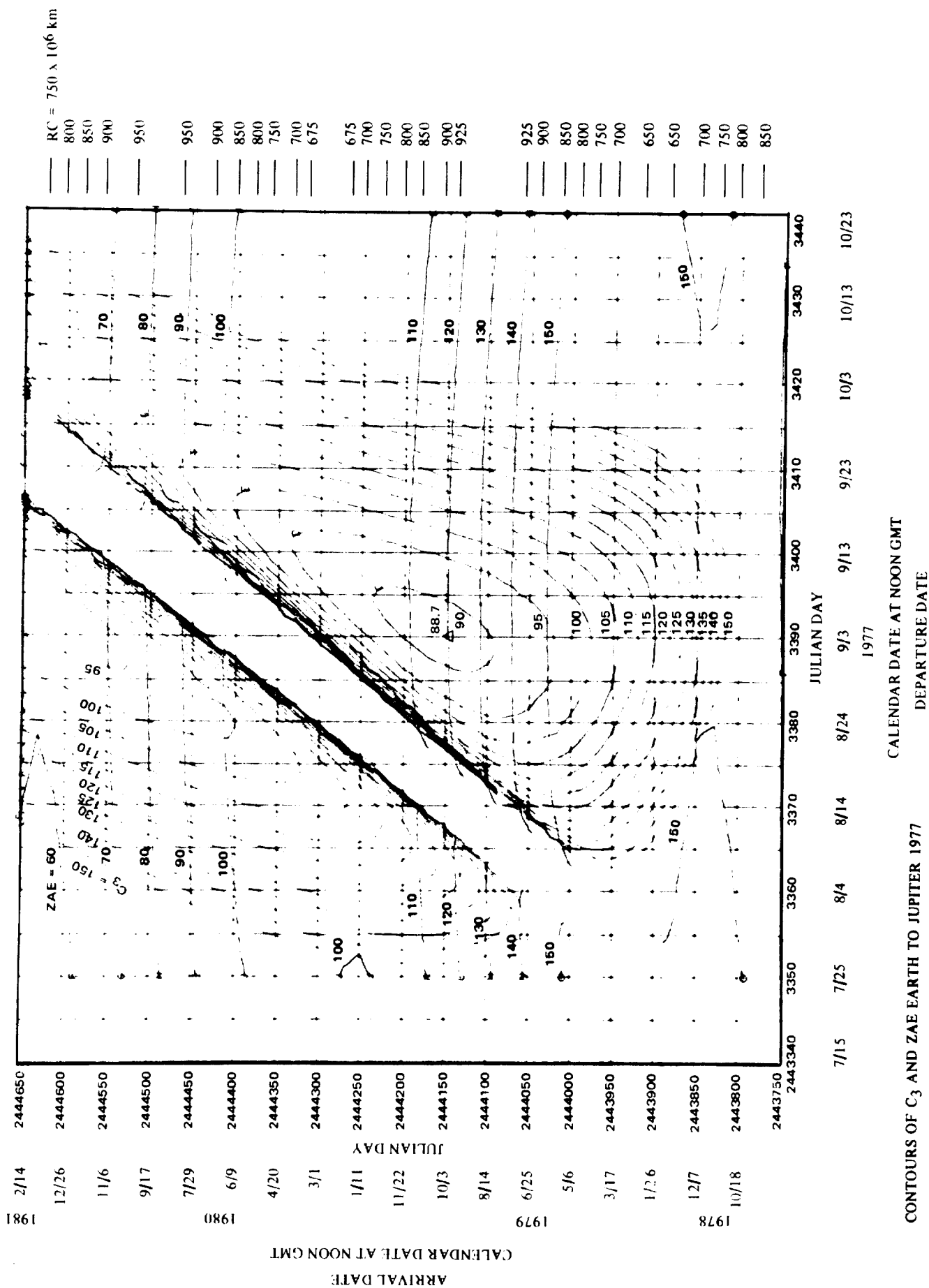


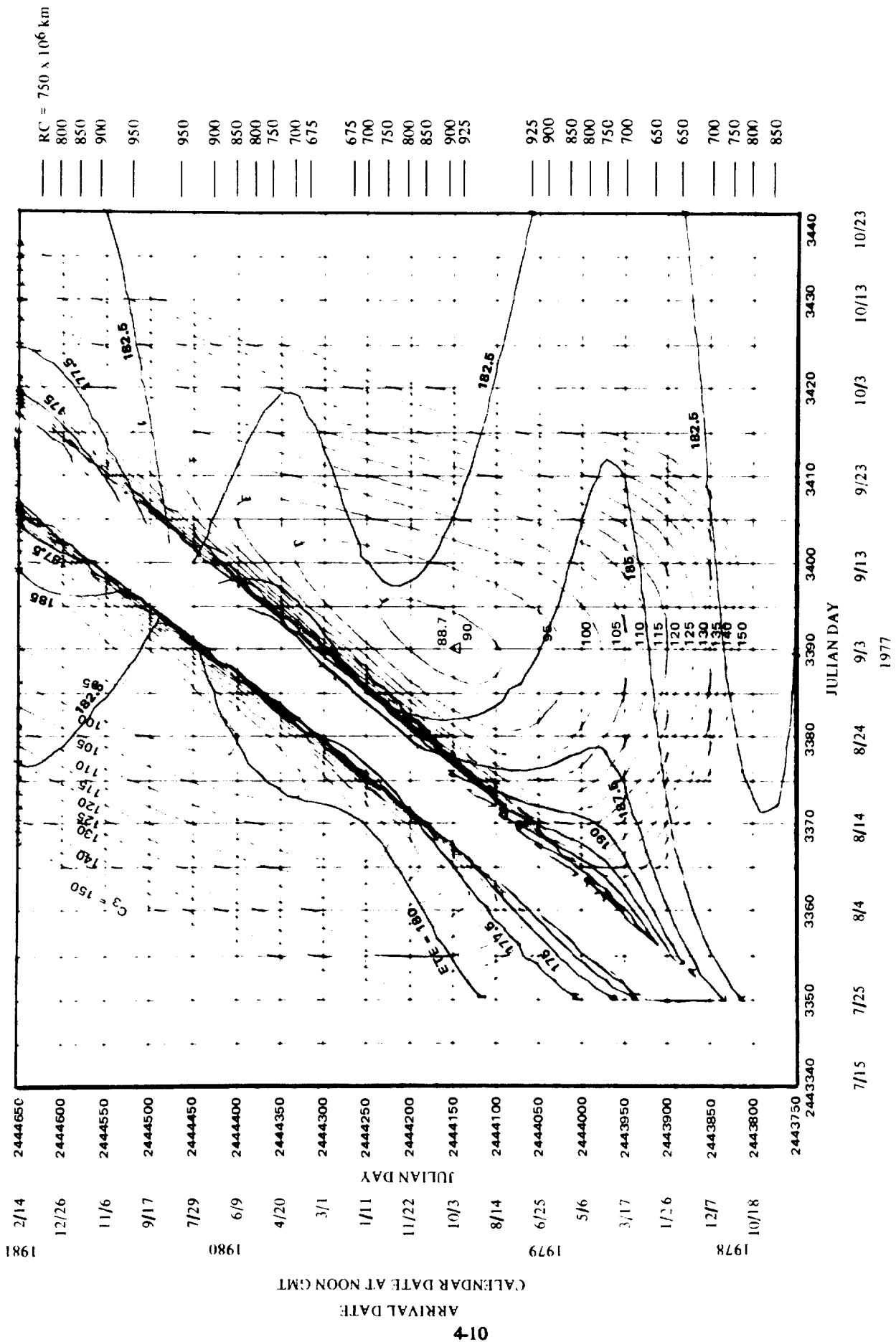
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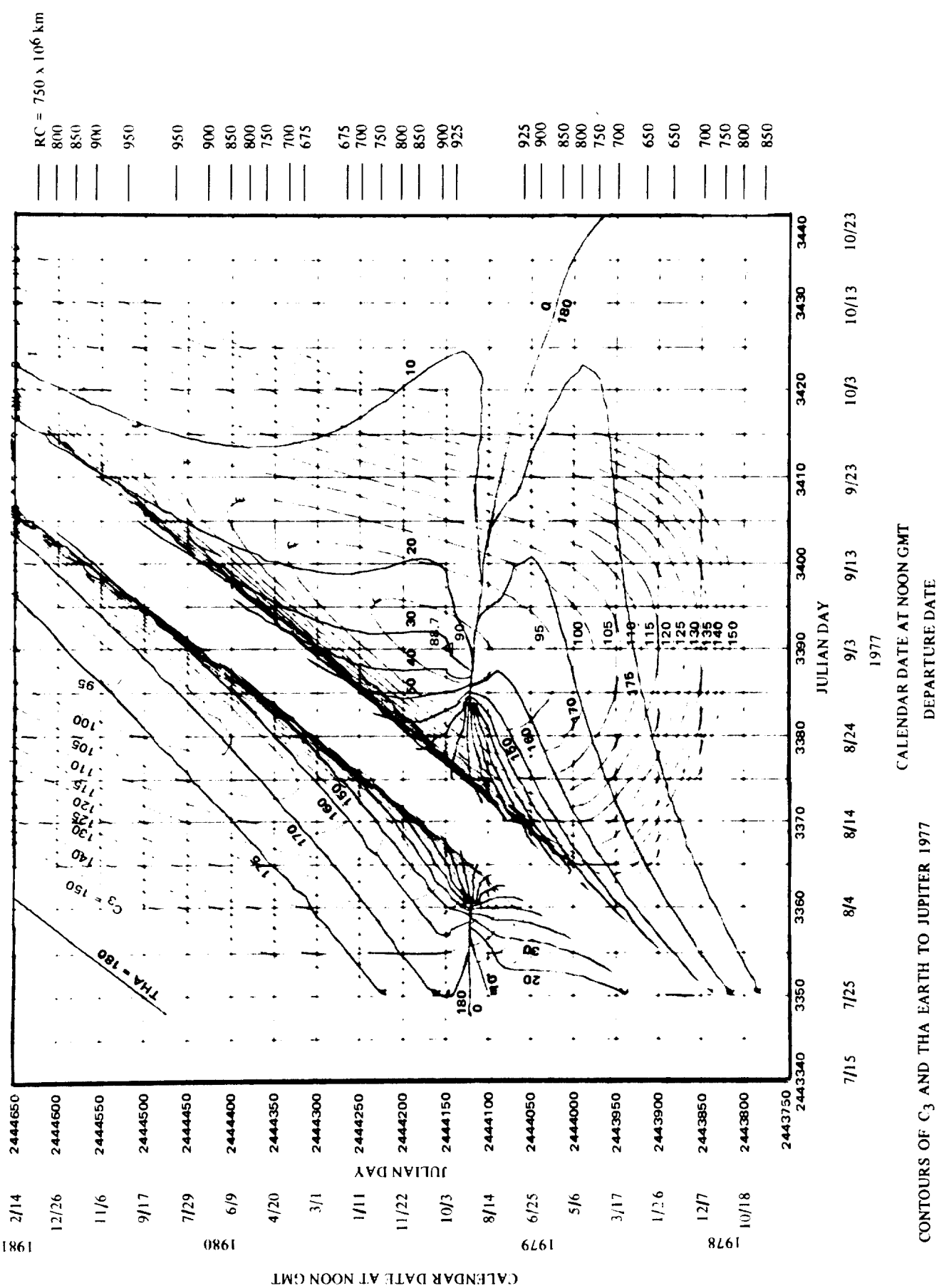
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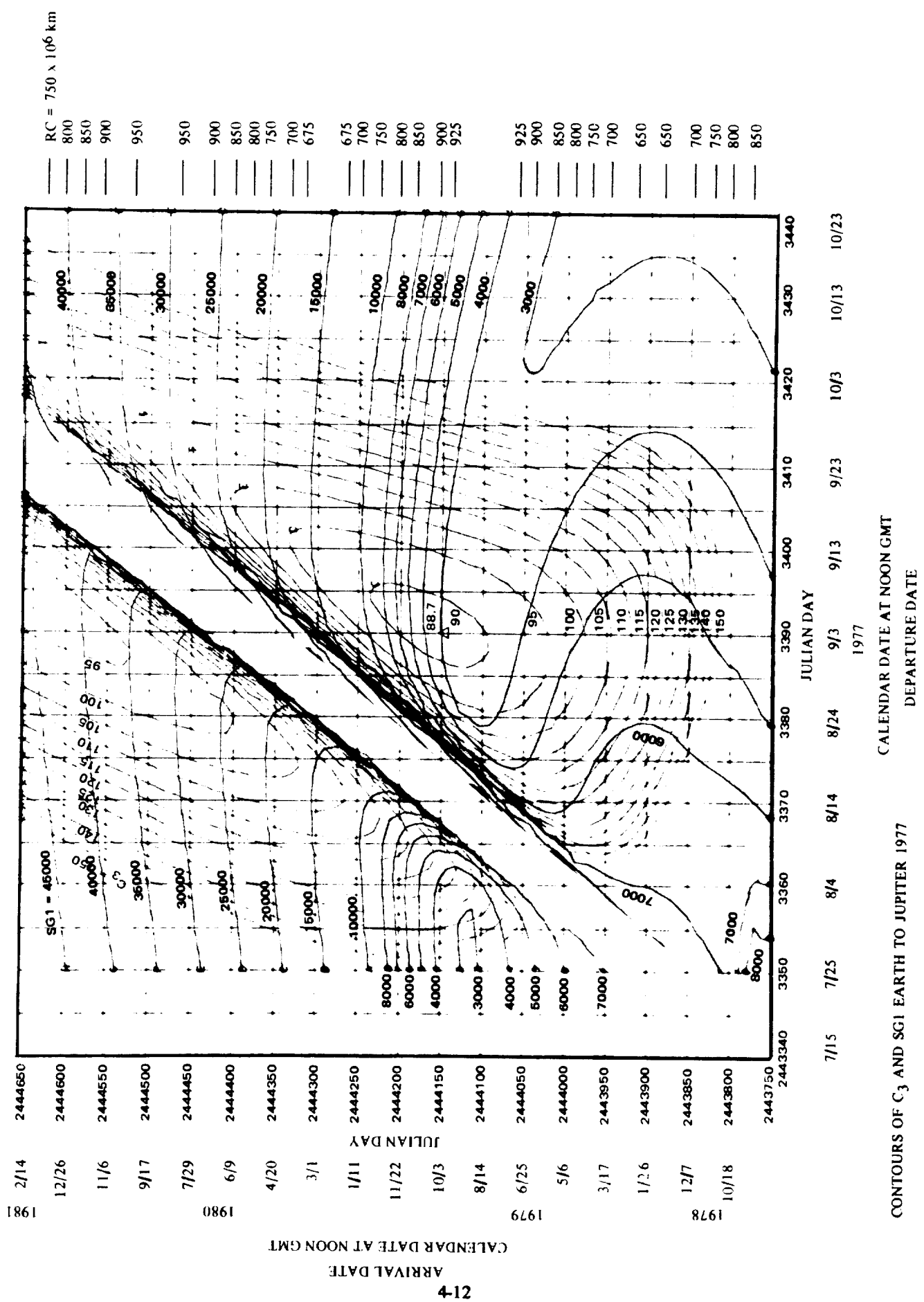


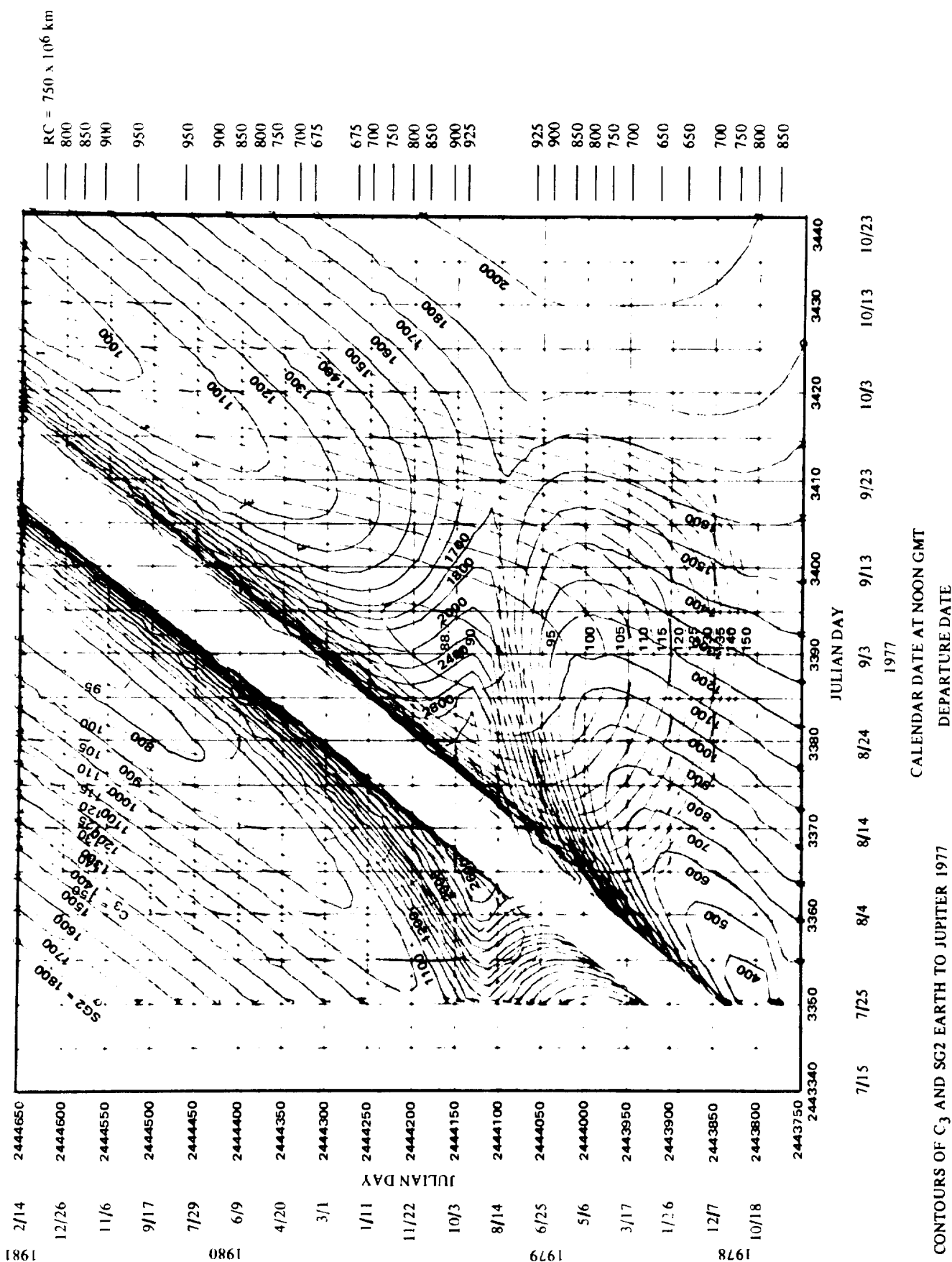


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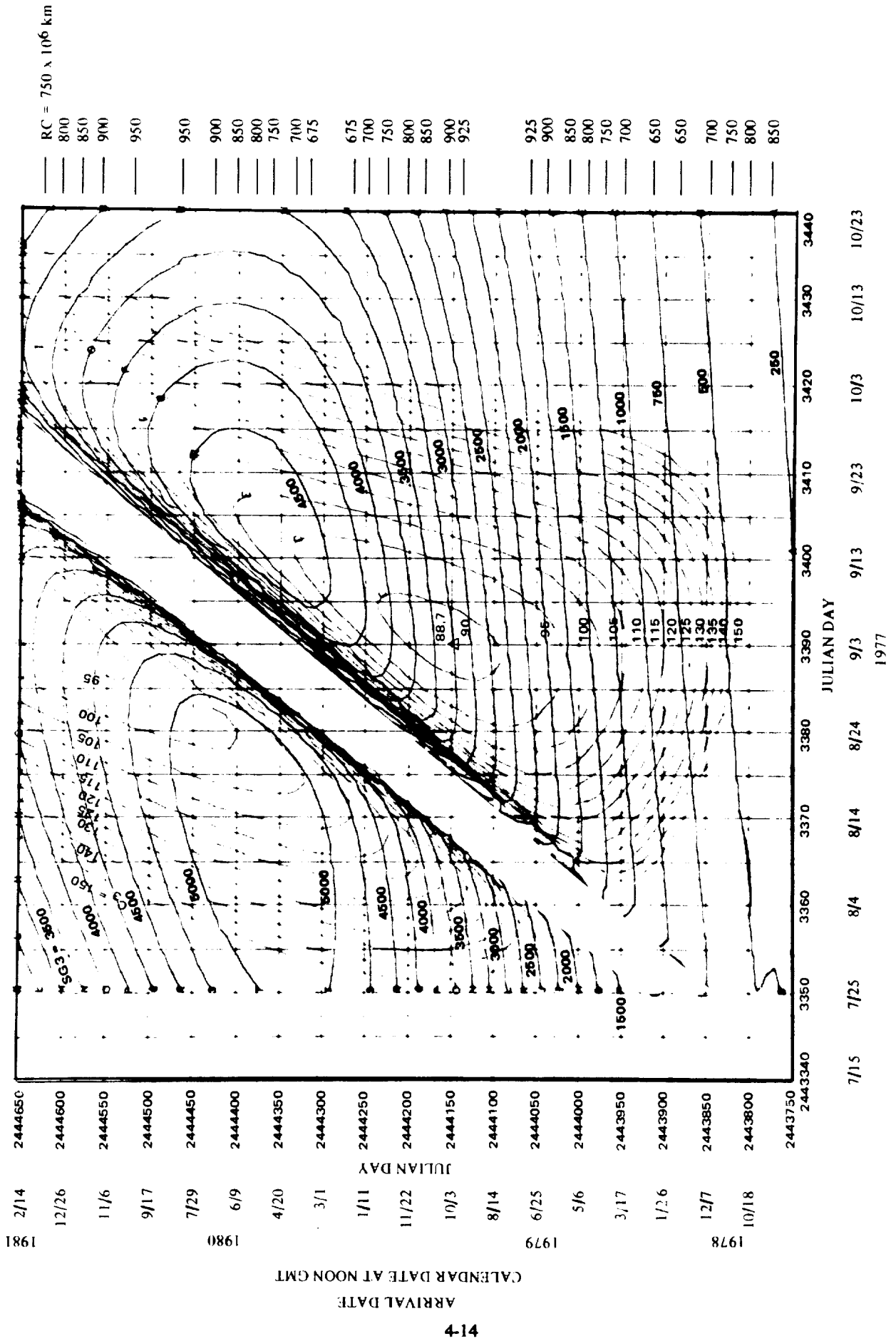


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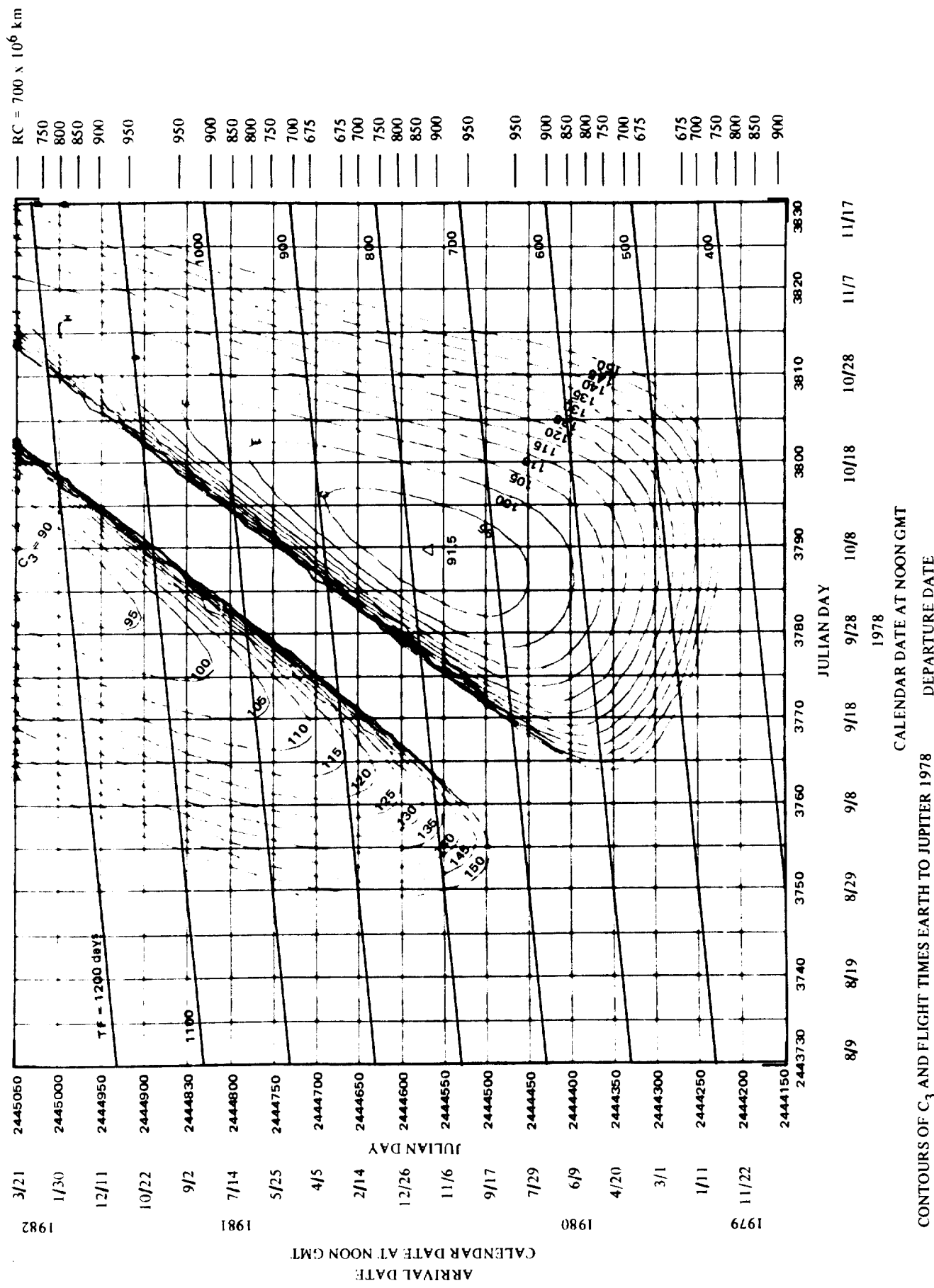
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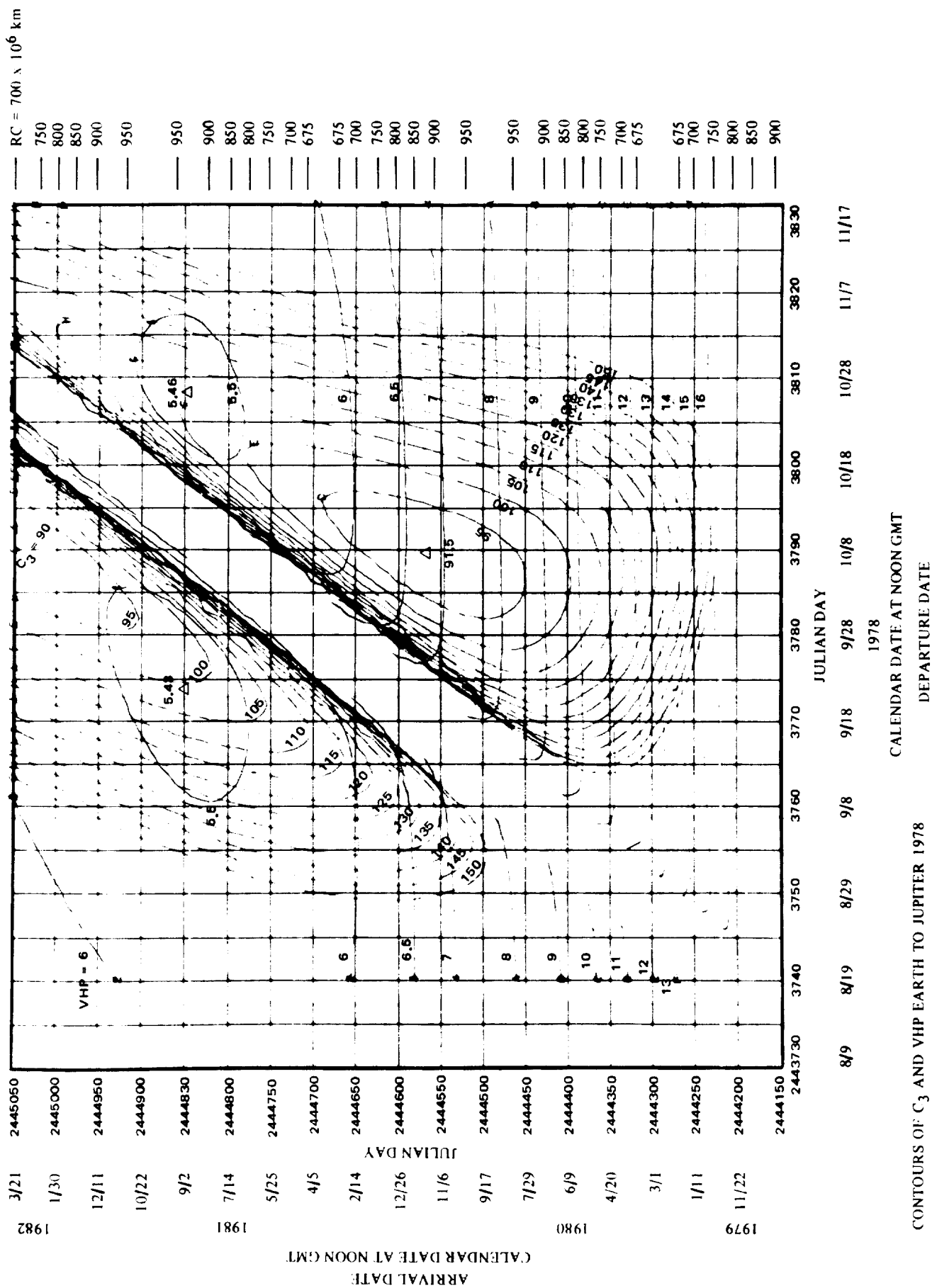


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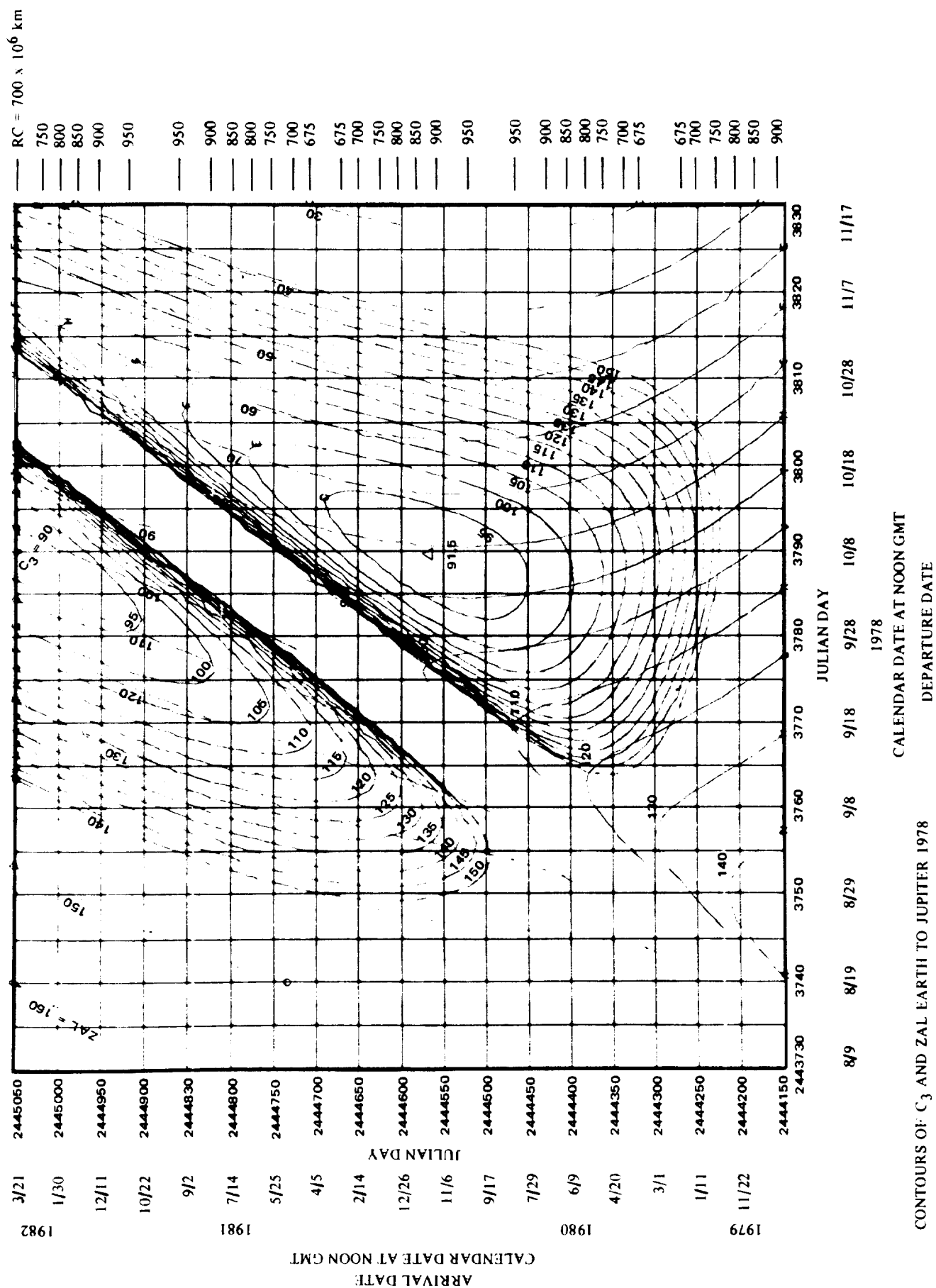


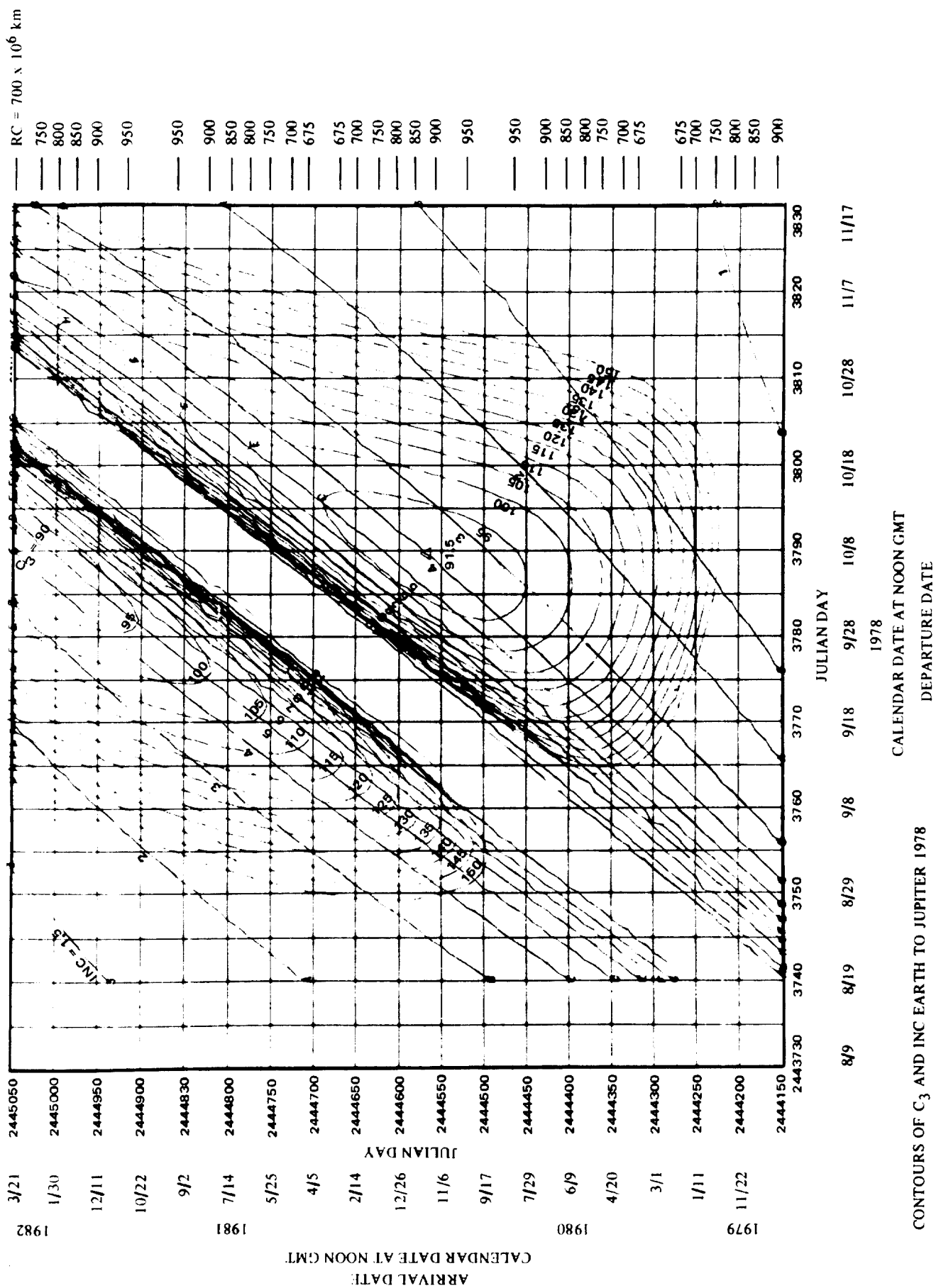
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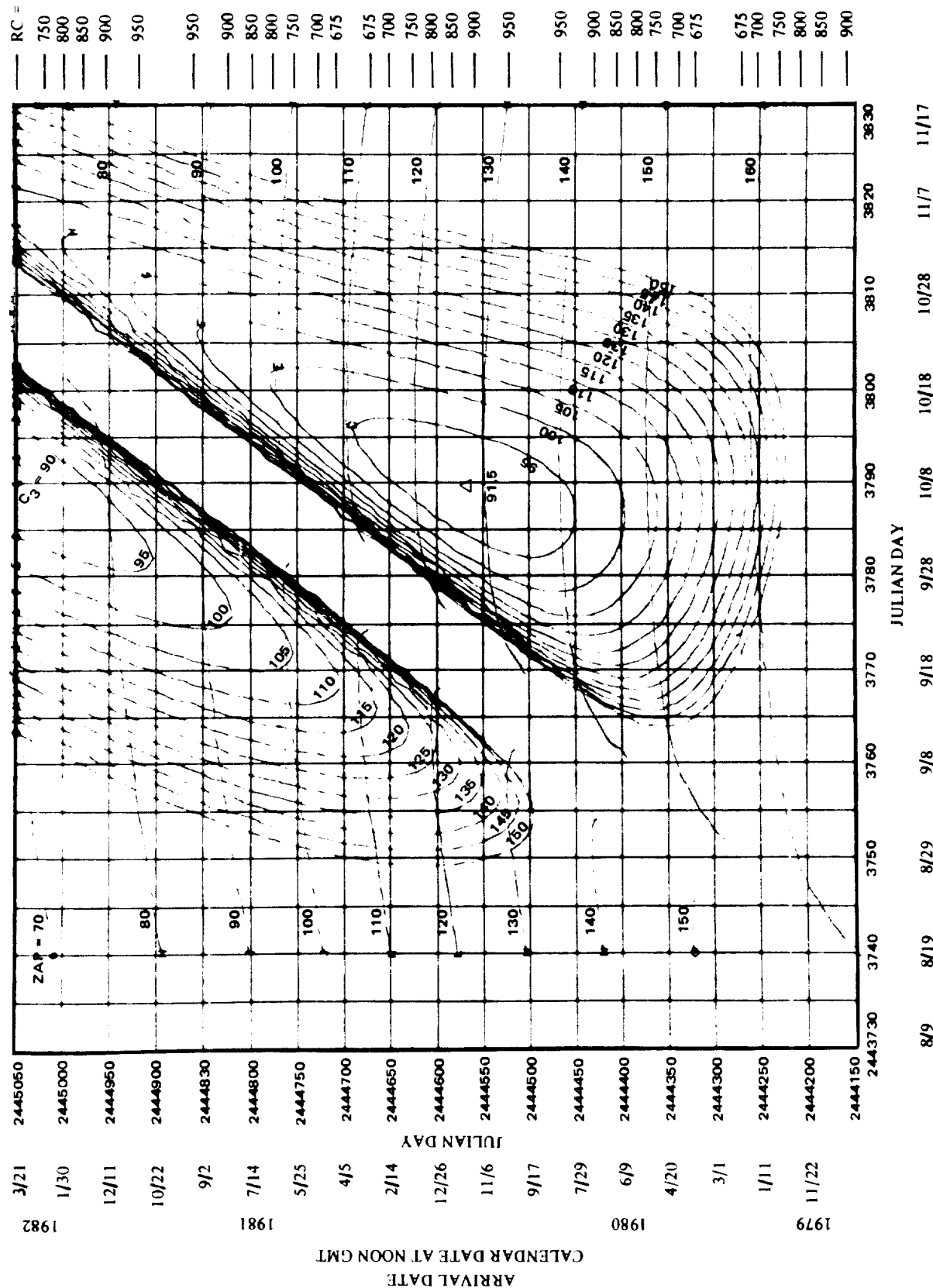
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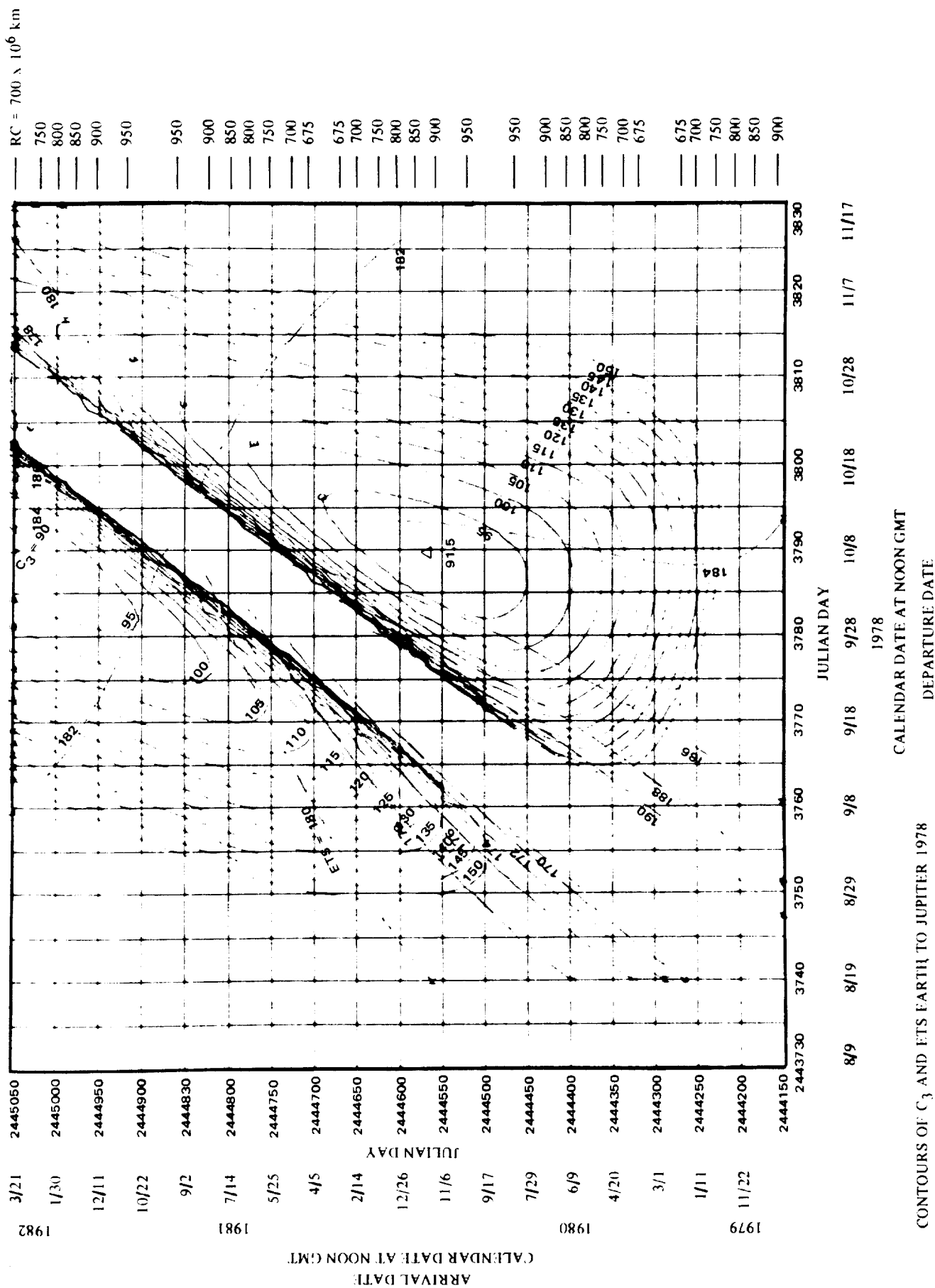


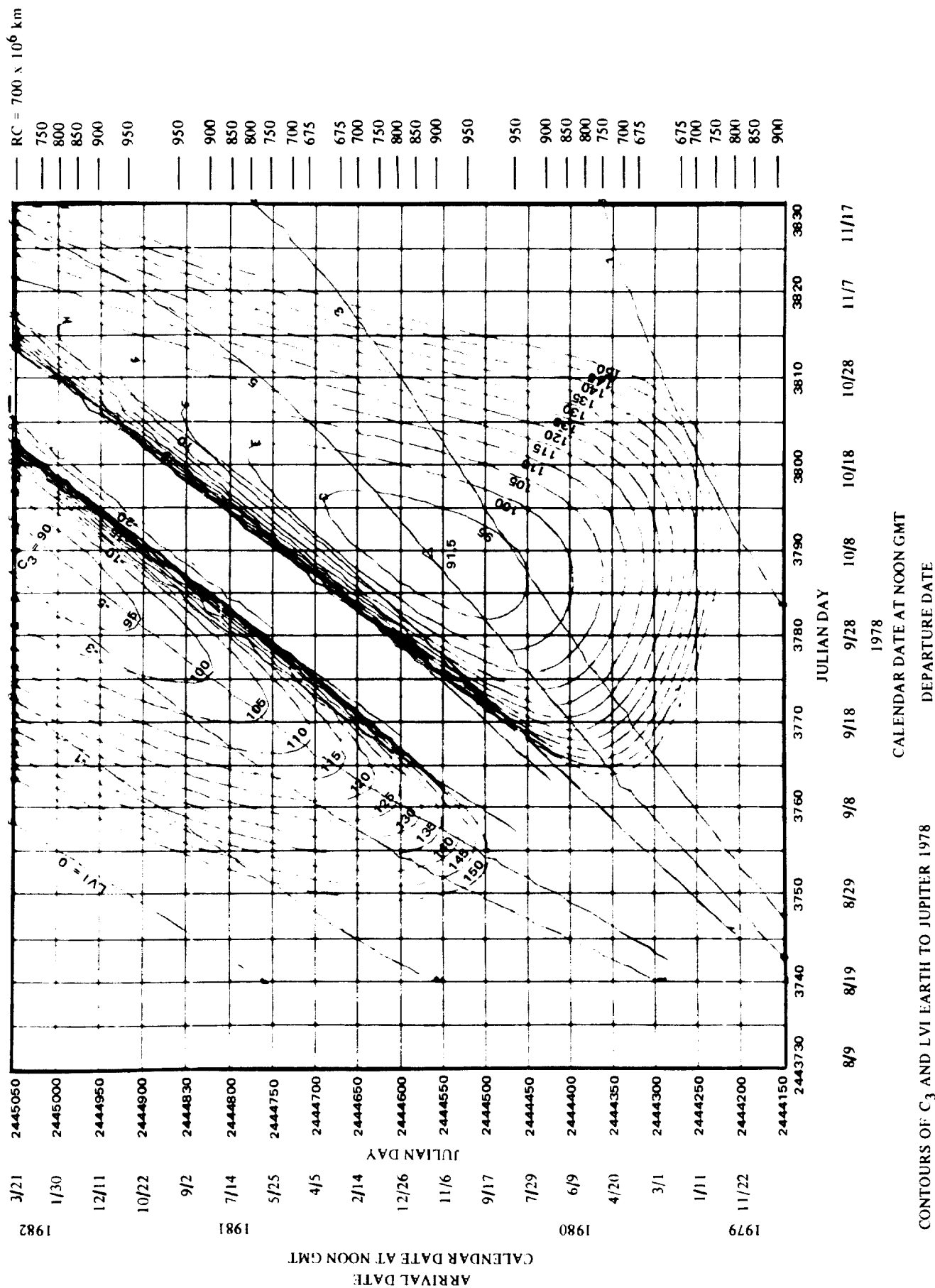


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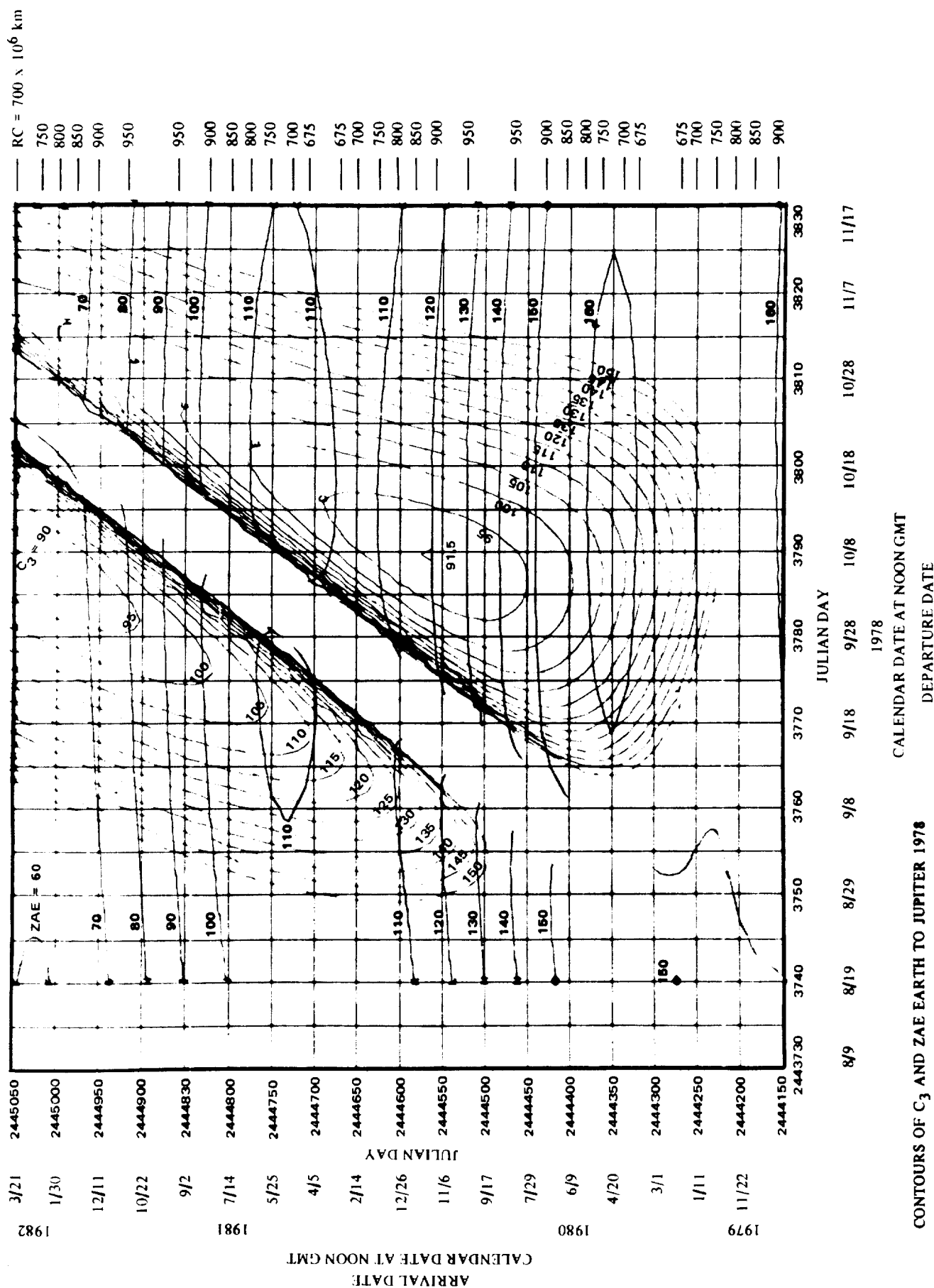


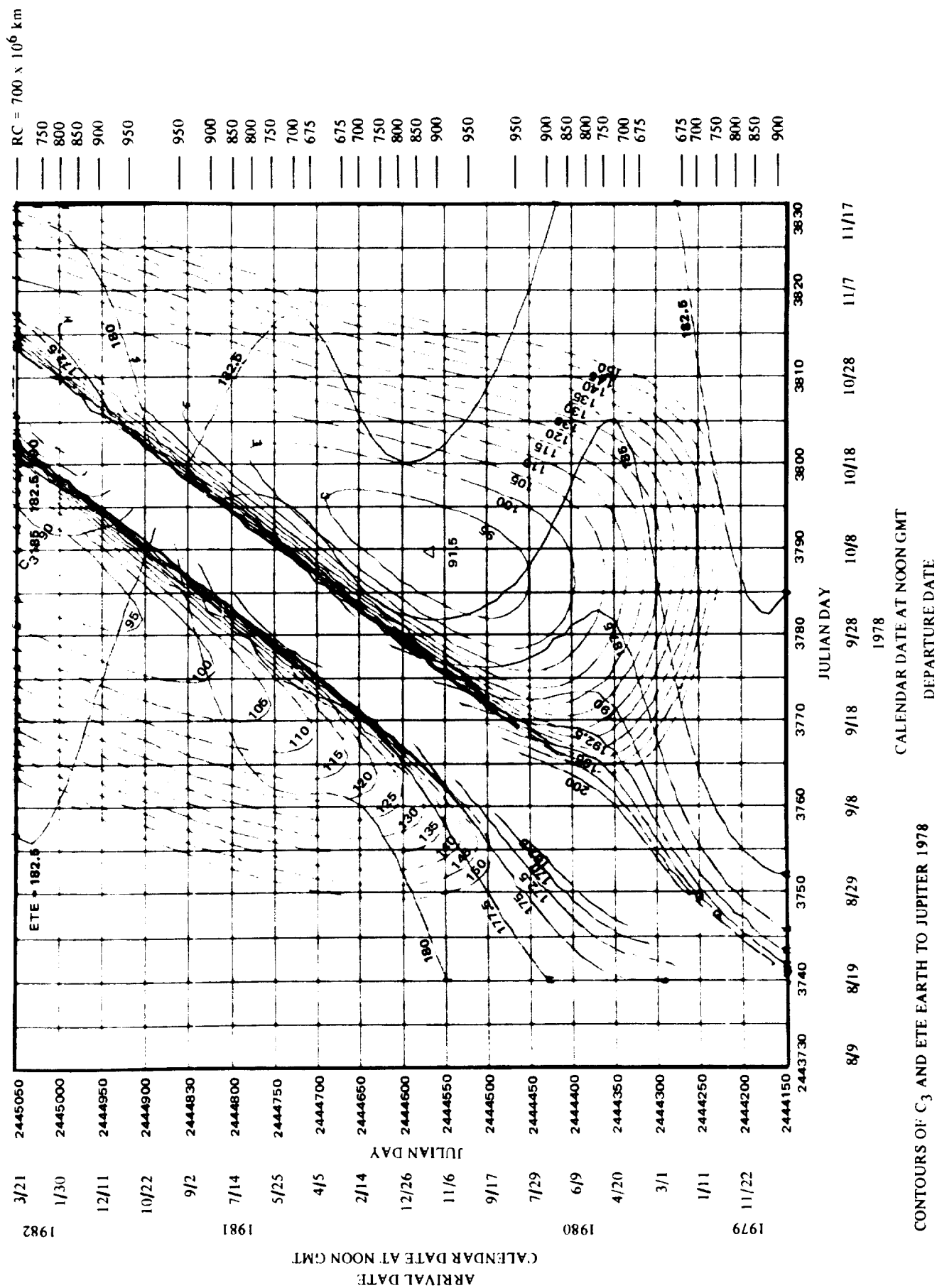
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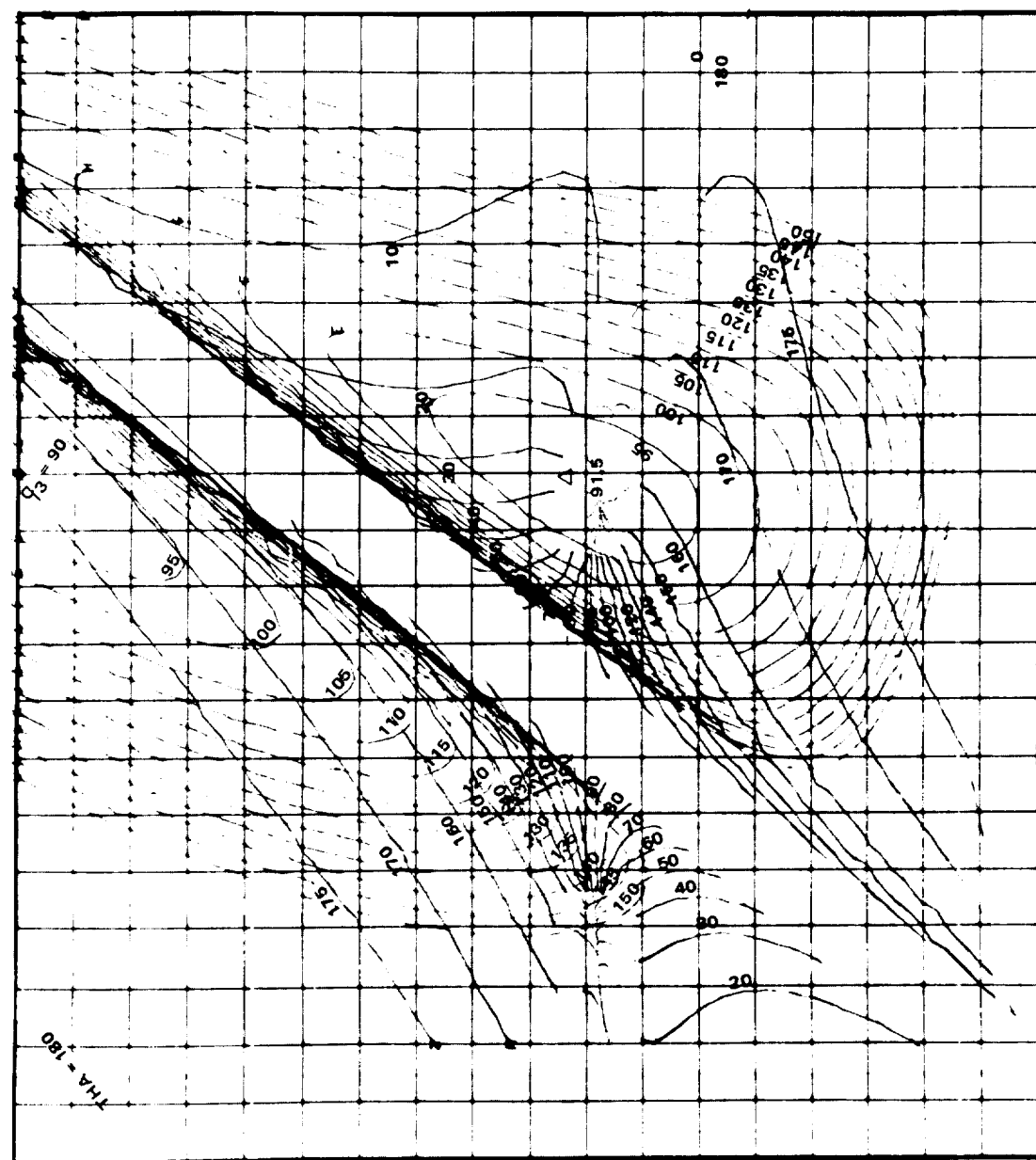






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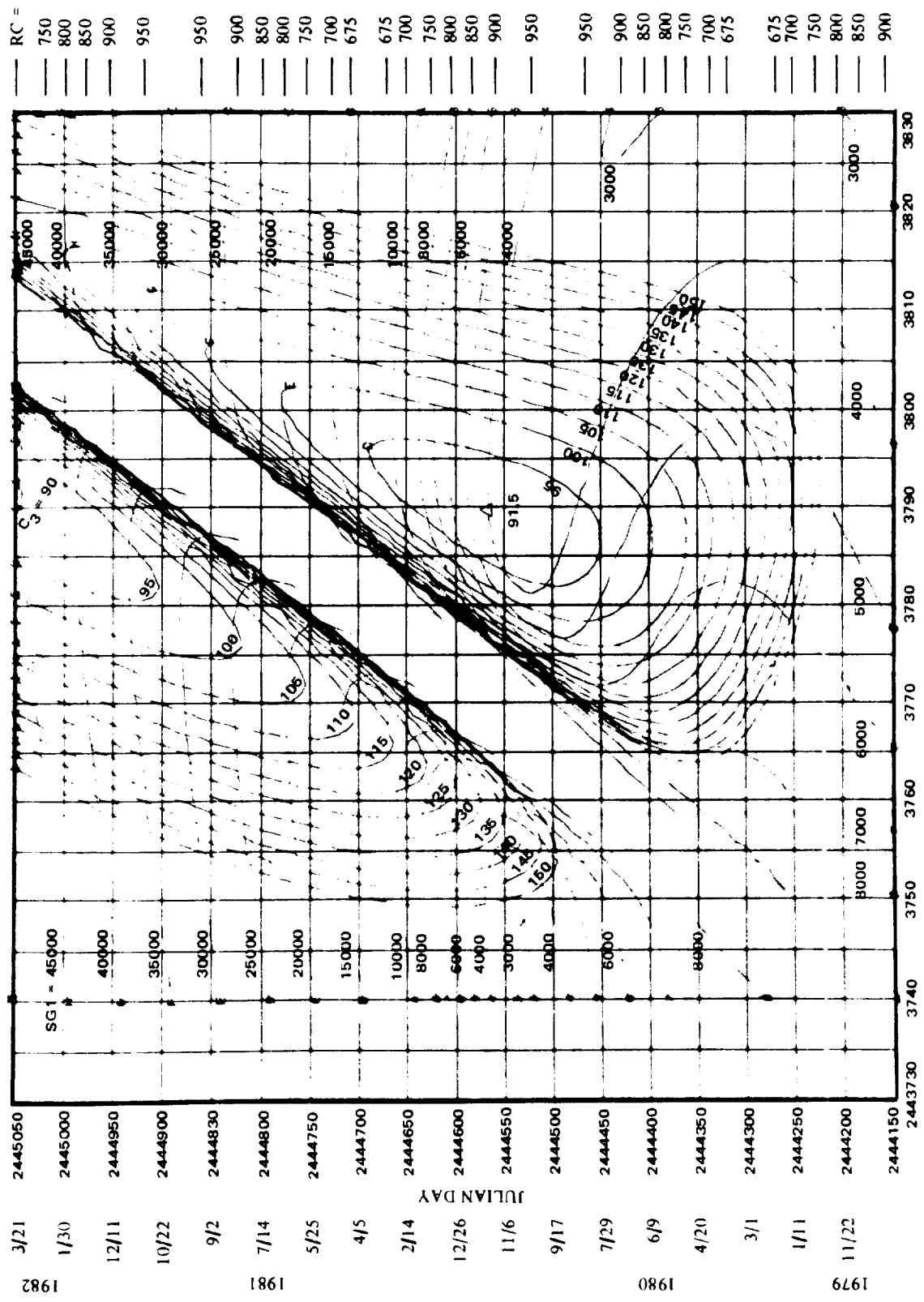
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RC = 700 x 10<sup>6</sup> km



JULIAN DAY

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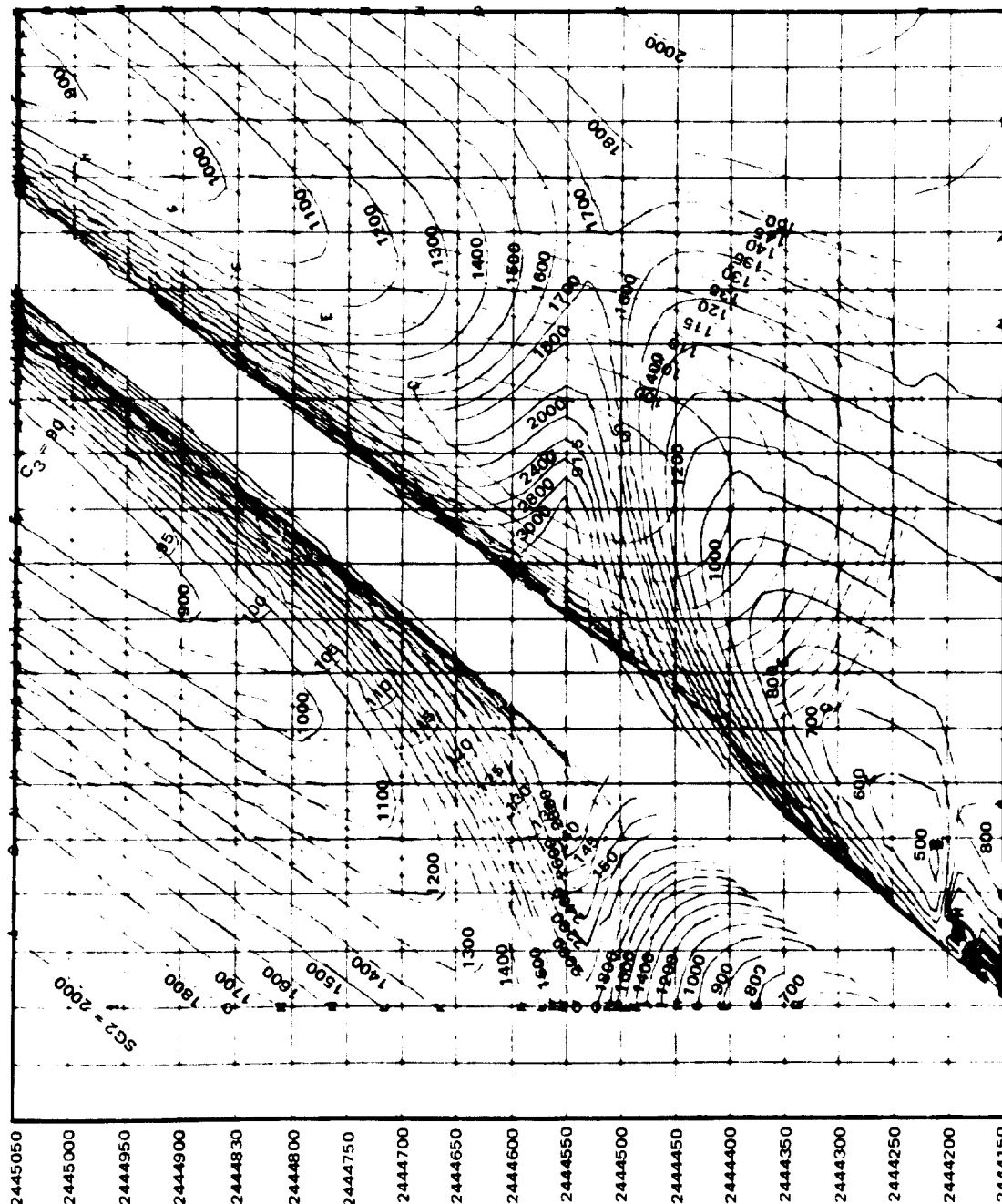
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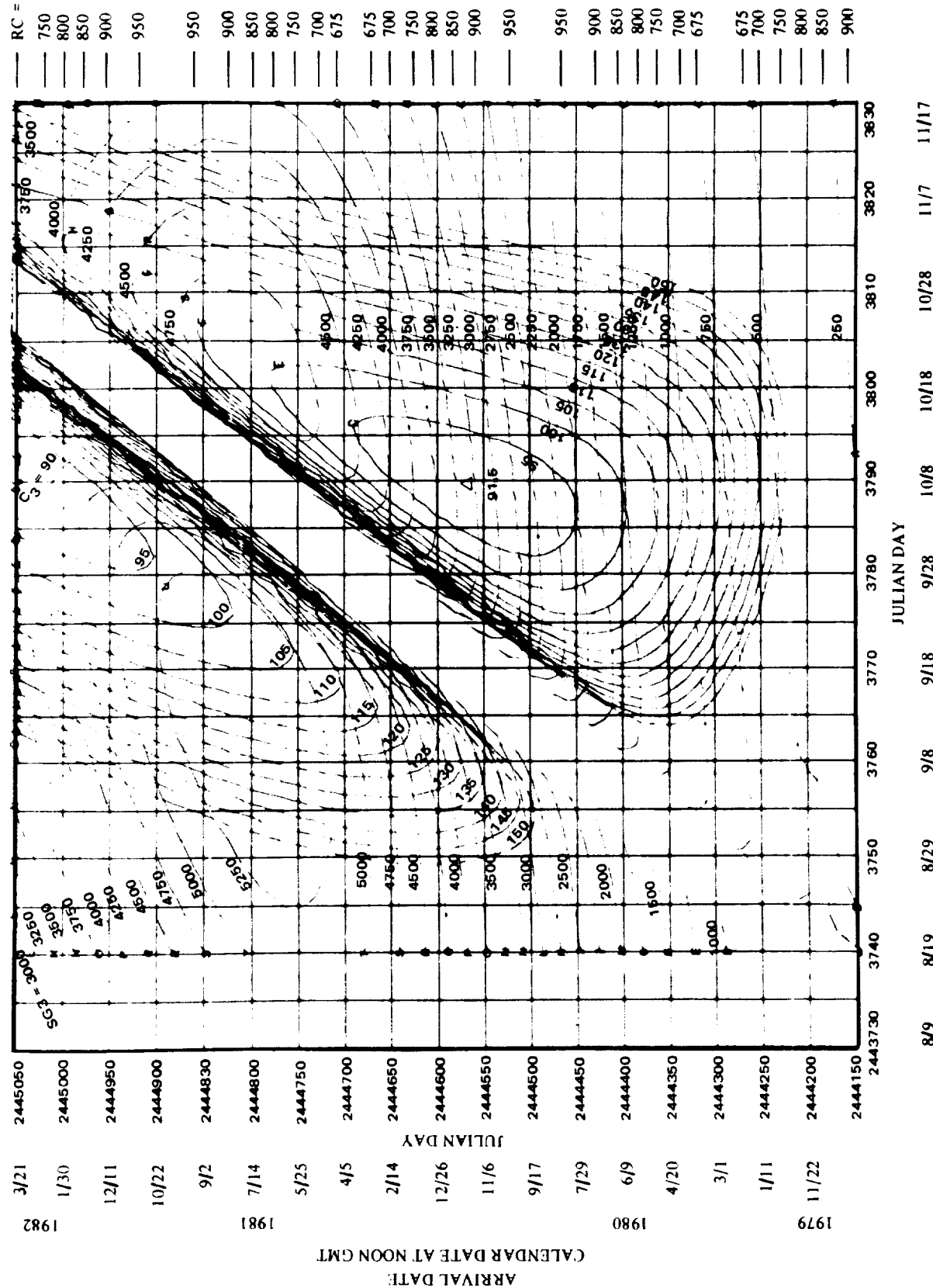
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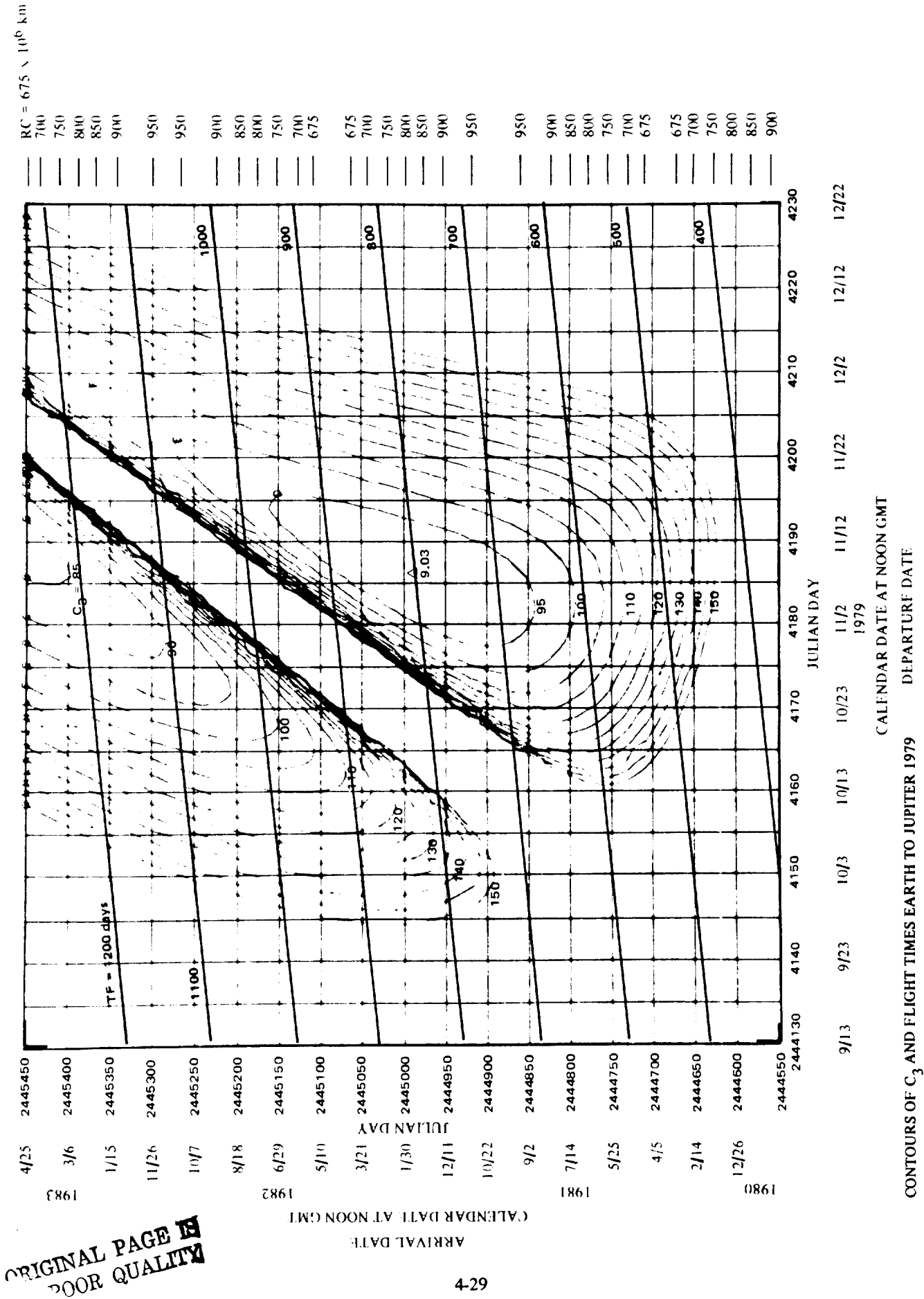
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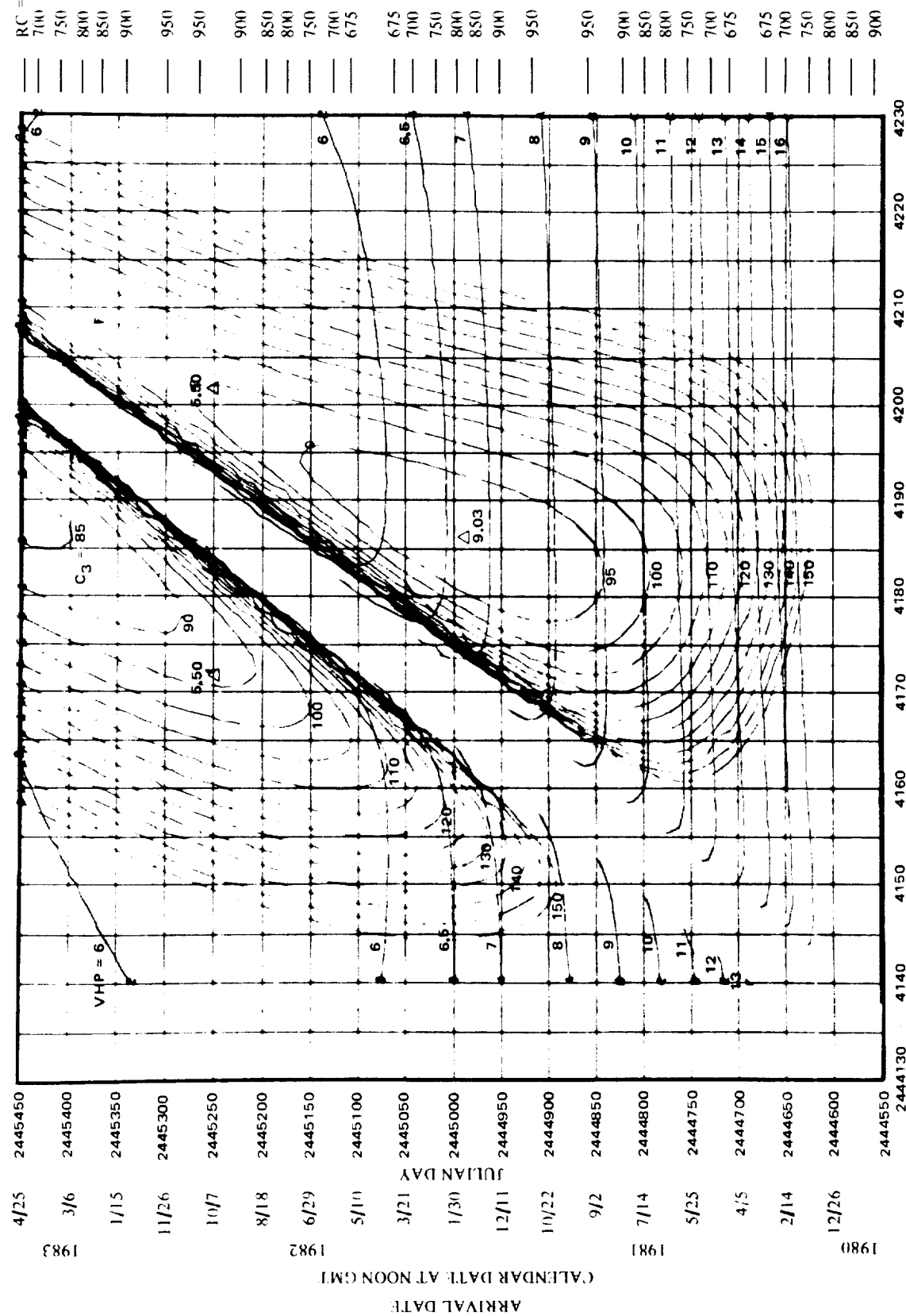
RC = 700 x 10<sup>6</sup> km





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POOR QUALITY

RC = 675 x 10<sup>6</sup> km

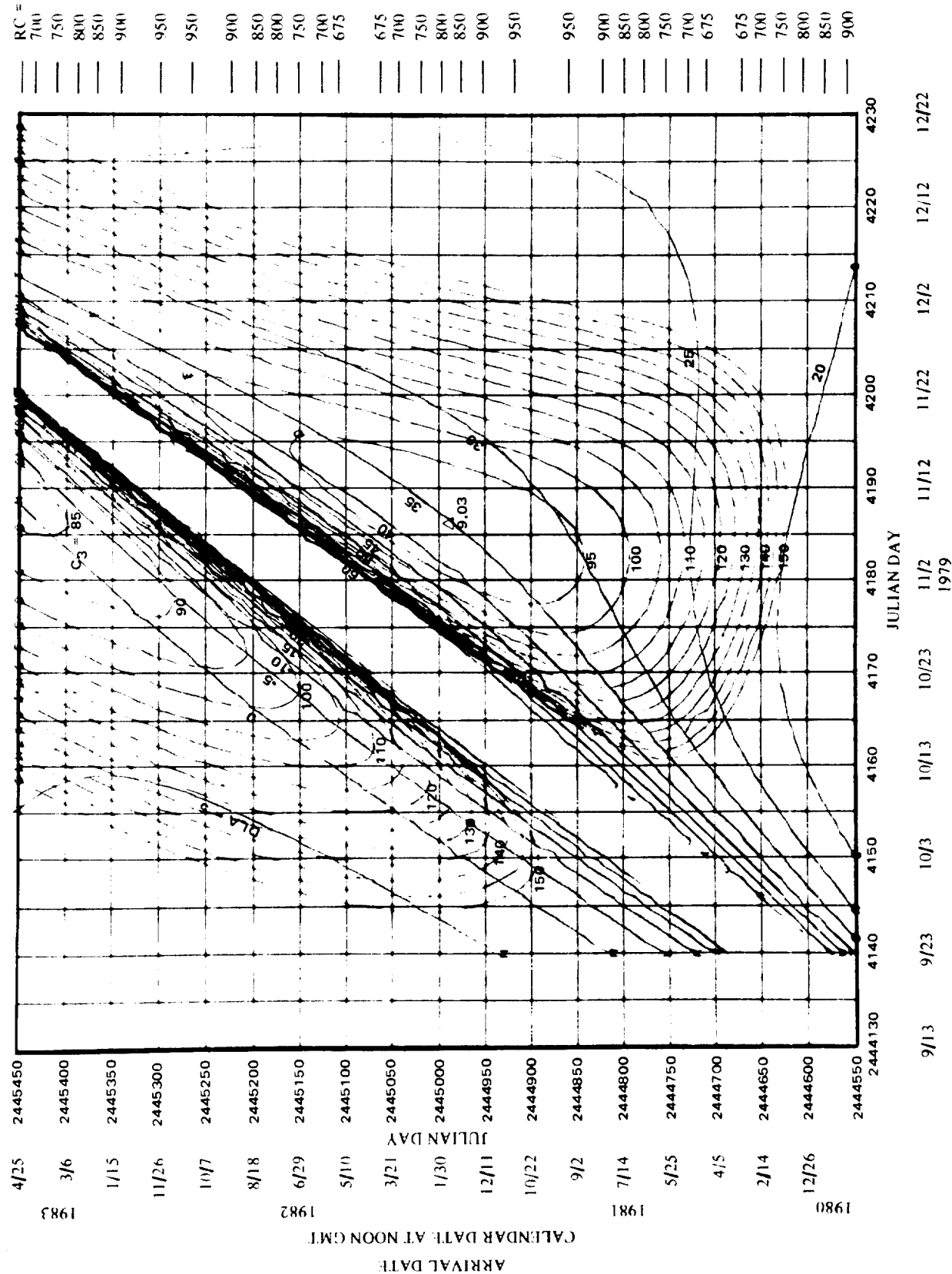


4130 4140 4150 4160 4170 4180 4190 4200 4210 4220 4230  
 JULIAN DAY  
 9/13 9/23 10/3 10/13 10/23 11/2 11/12 11/22 12/2 12/12 12/22  
 CALENDAR DATE AT NOON GMT  
 1979  
 DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND VHP EARTH TO JUPITER 1979

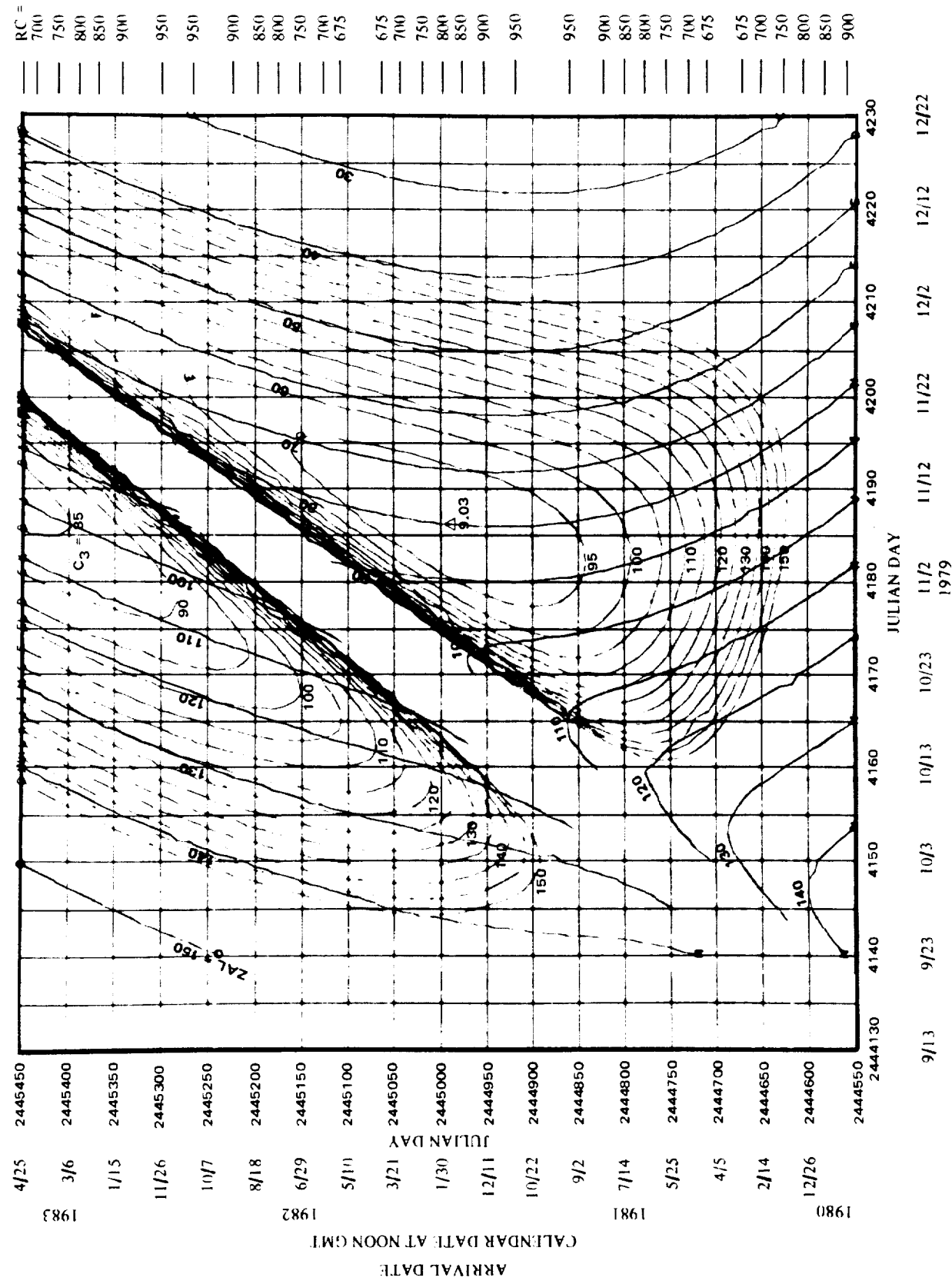


RC = 675 x 10<sup>6</sup> km



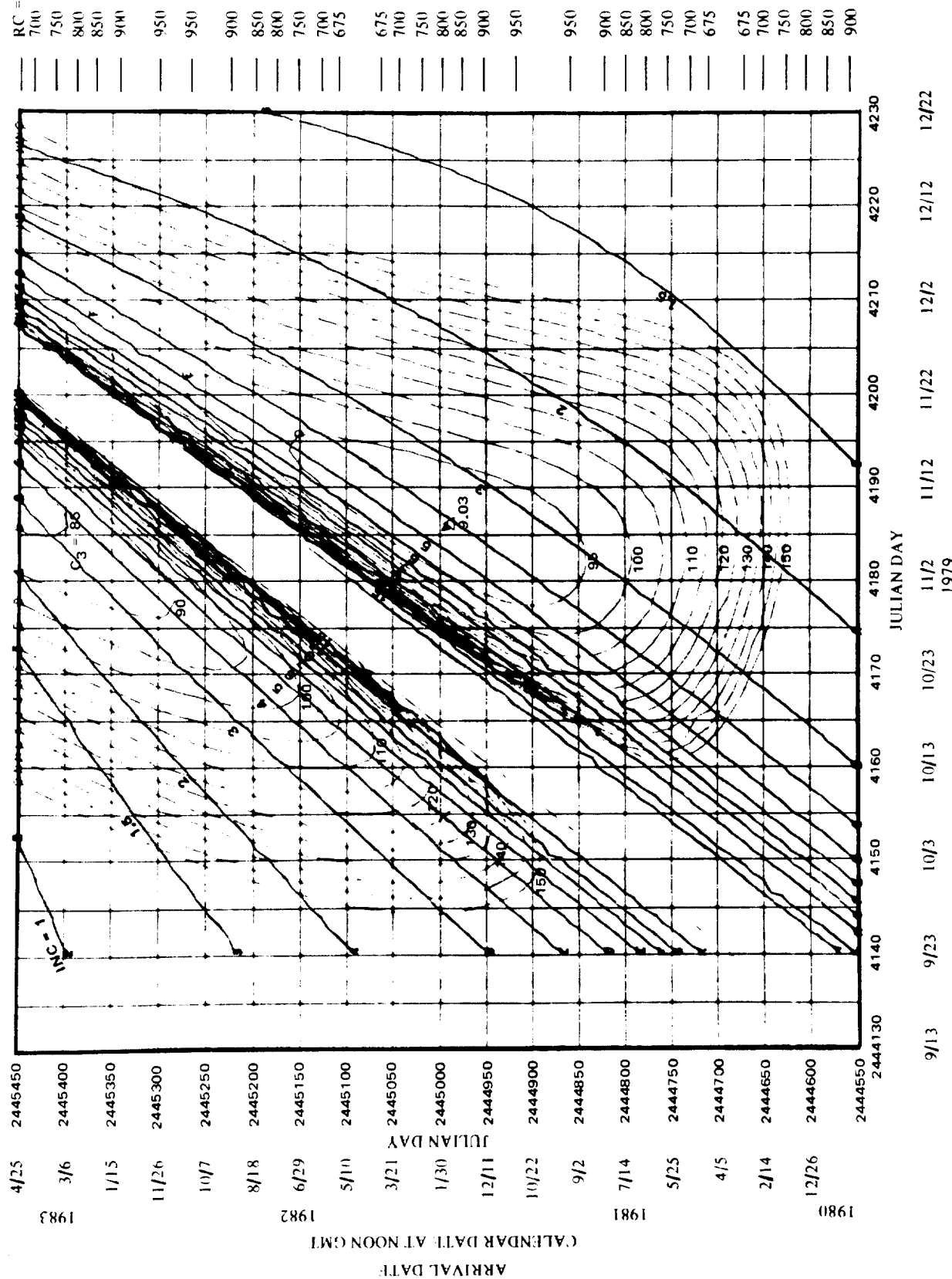
CONTOURS OF C<sub>3</sub> AND DLA EARTH TO JUPITER 1979

RC = 675 x 10<sup>6</sup> km



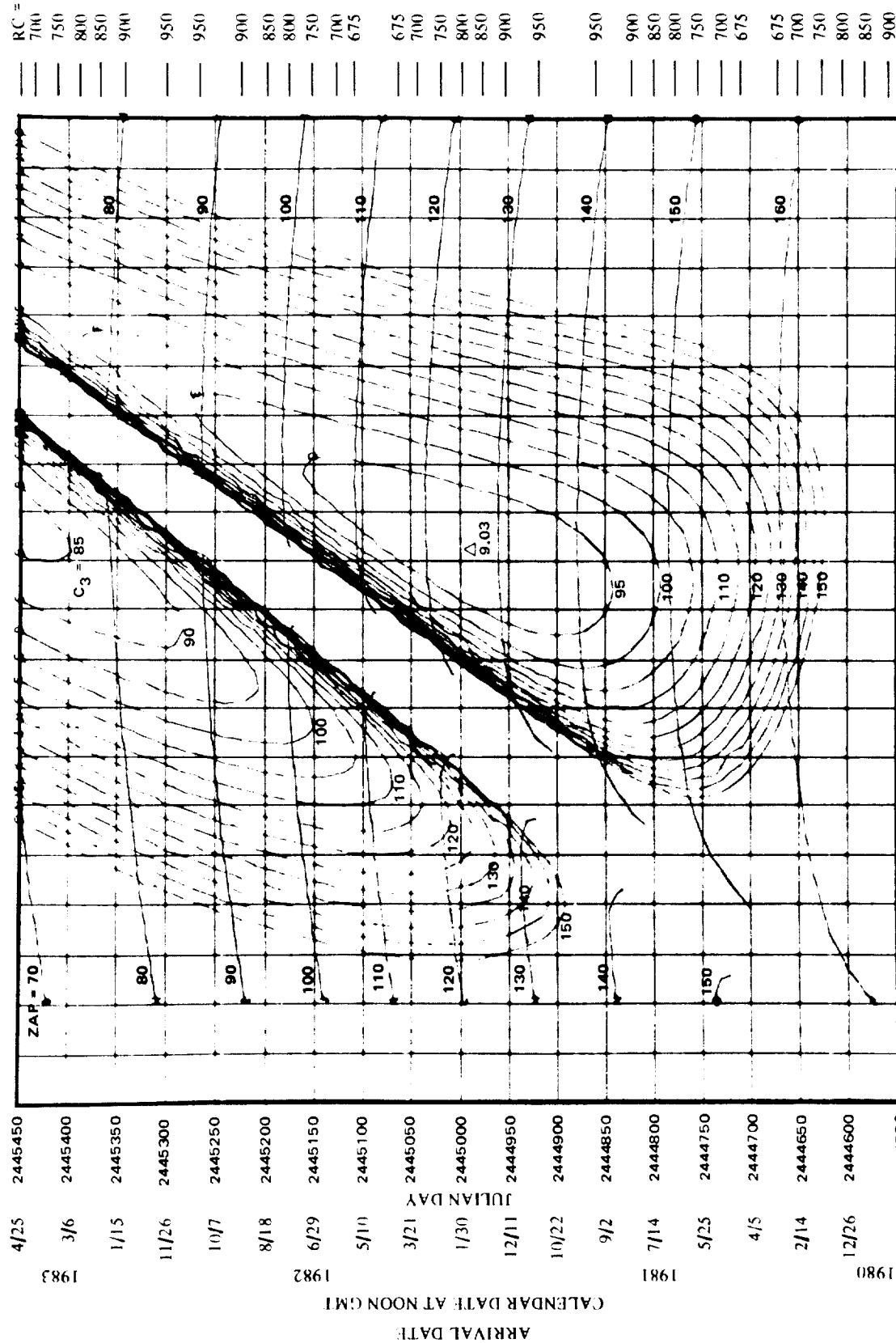
CONTOURS OF C<sub>3</sub> AND ZAL EARTH TO JUPITER 1979

RC = 675 x 10<sup>6</sup> km



CONTOURS OF C<sub>3</sub> AND INC EARTH TO JUPITER 1979

RC = 675 x 10<sup>6</sup> km

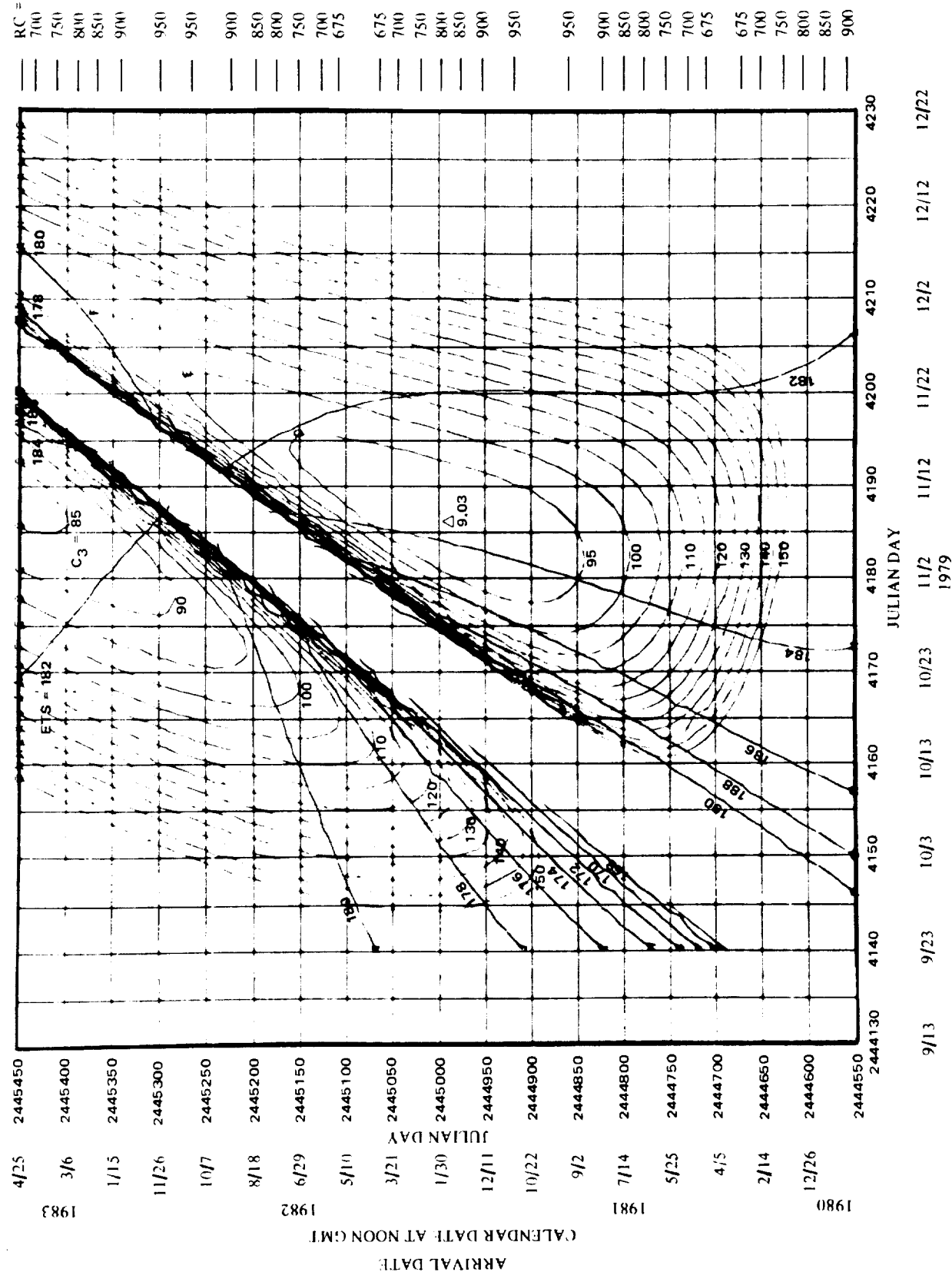


ARRIVAL DATE  
CALENDAR DATE AT NOON GMT

DEPARTURE DATE  
CALENDAR DATE AT NOON GMT

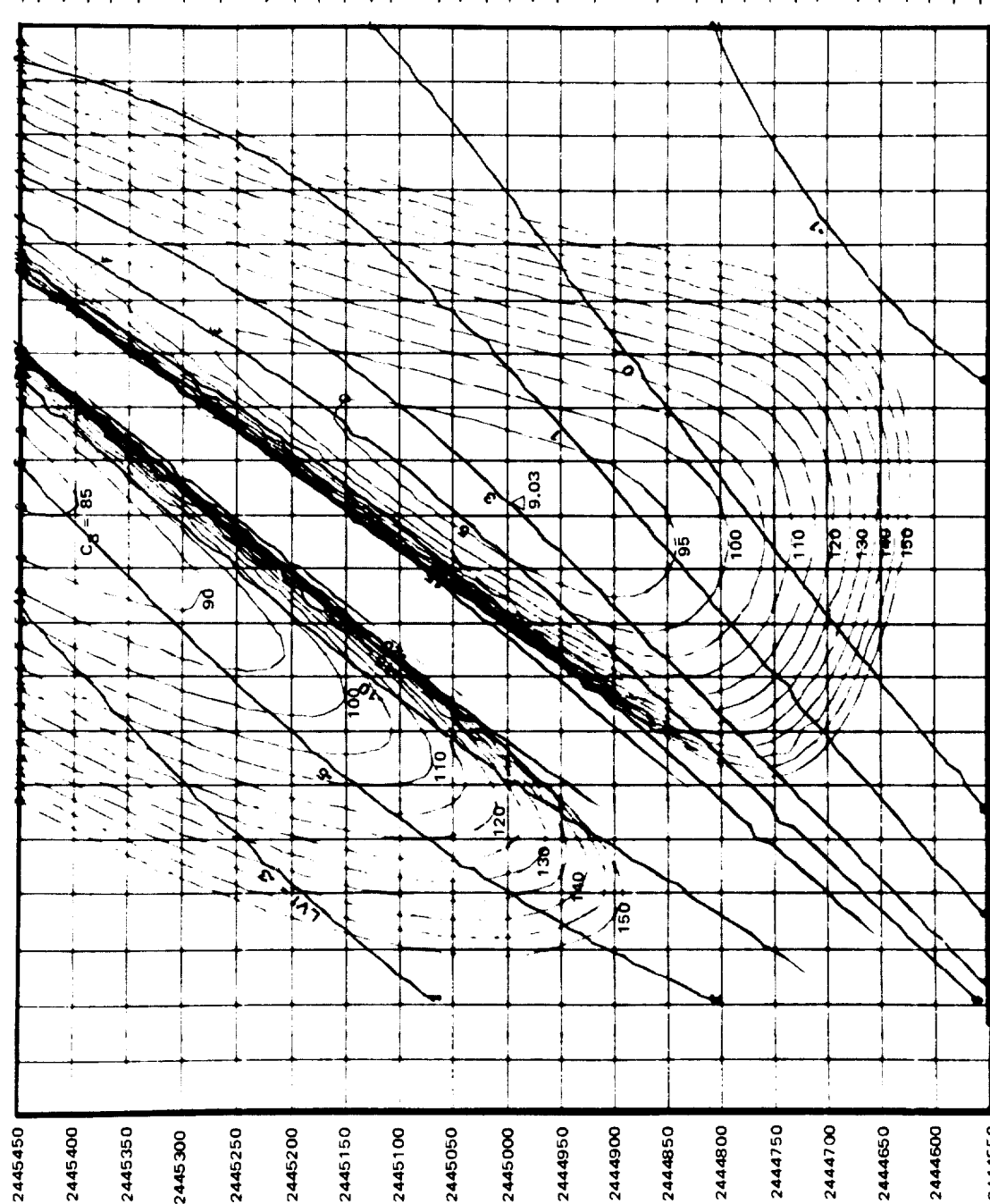
CONTOURS OF C<sub>3</sub> AND ZAP EARTH TO JUPITER 1979

RC =  $675 \times 10^6$  km



RC = 675  $\times$  10<sup>6</sup> km

700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900



4/25 2445450  
3/6 2445400  
1/15 2445350  
11/26 2445300  
10/7 2445250  
8/18 2445200  
6/29 2445150  
5/10 2445100  
3/21 2445050  
1/30 2445000  
12/11 2444950  
10/22 2444900  
9/2 2444850  
7/14 2444800  
5/25 2444750  
4/5 2444700  
2/14 2444650  
12/26 2444600  
1980  
1981  
1982  
1983

JULIAN DAY

9/13 9/23 10/3 10/13 10/23 11/2 11/12 11/22 12/2 12/12 12/22

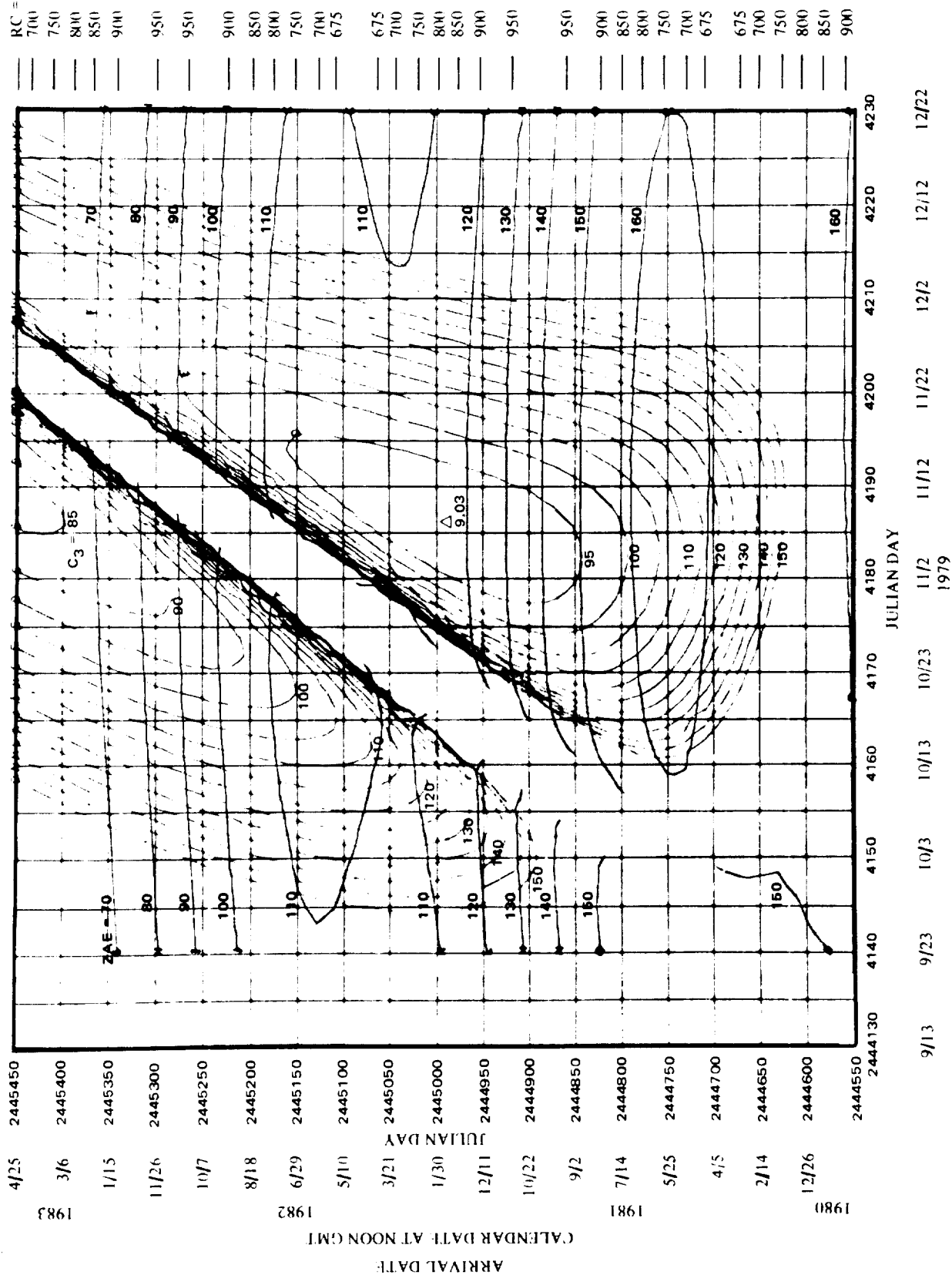
CALENDAR DATE AT NOON GMT

1979

CONTOURS OF C<sub>3</sub> AND LVI EARTH TO JUPITER 1979

DEPARTURE DATE

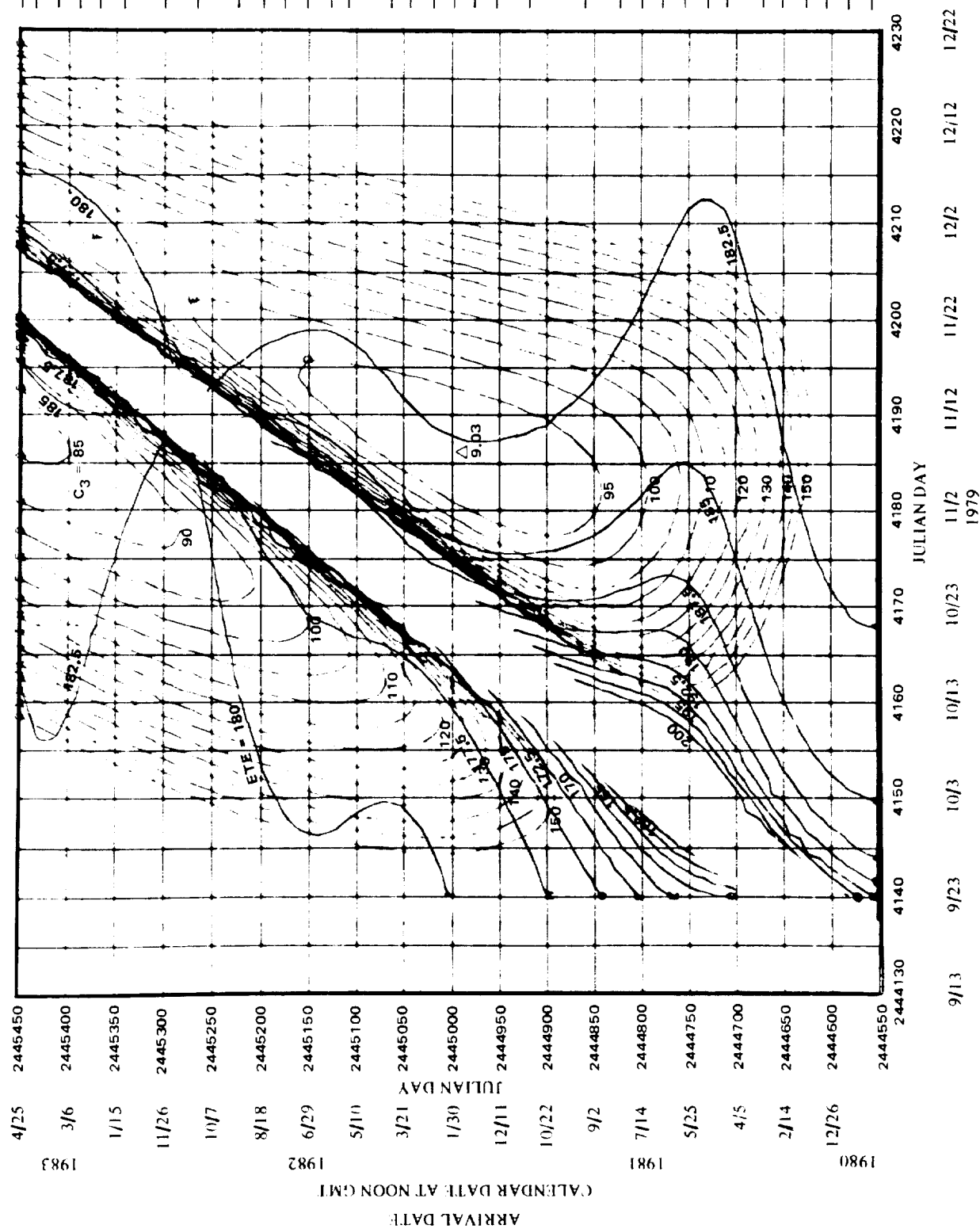
RC = 675 x 10<sup>6</sup> km



CONTOURS OF C<sub>3</sub> AND ZAE EARTH TO JUPITER 1979

RC = 675 x 10<sup>6</sup> km

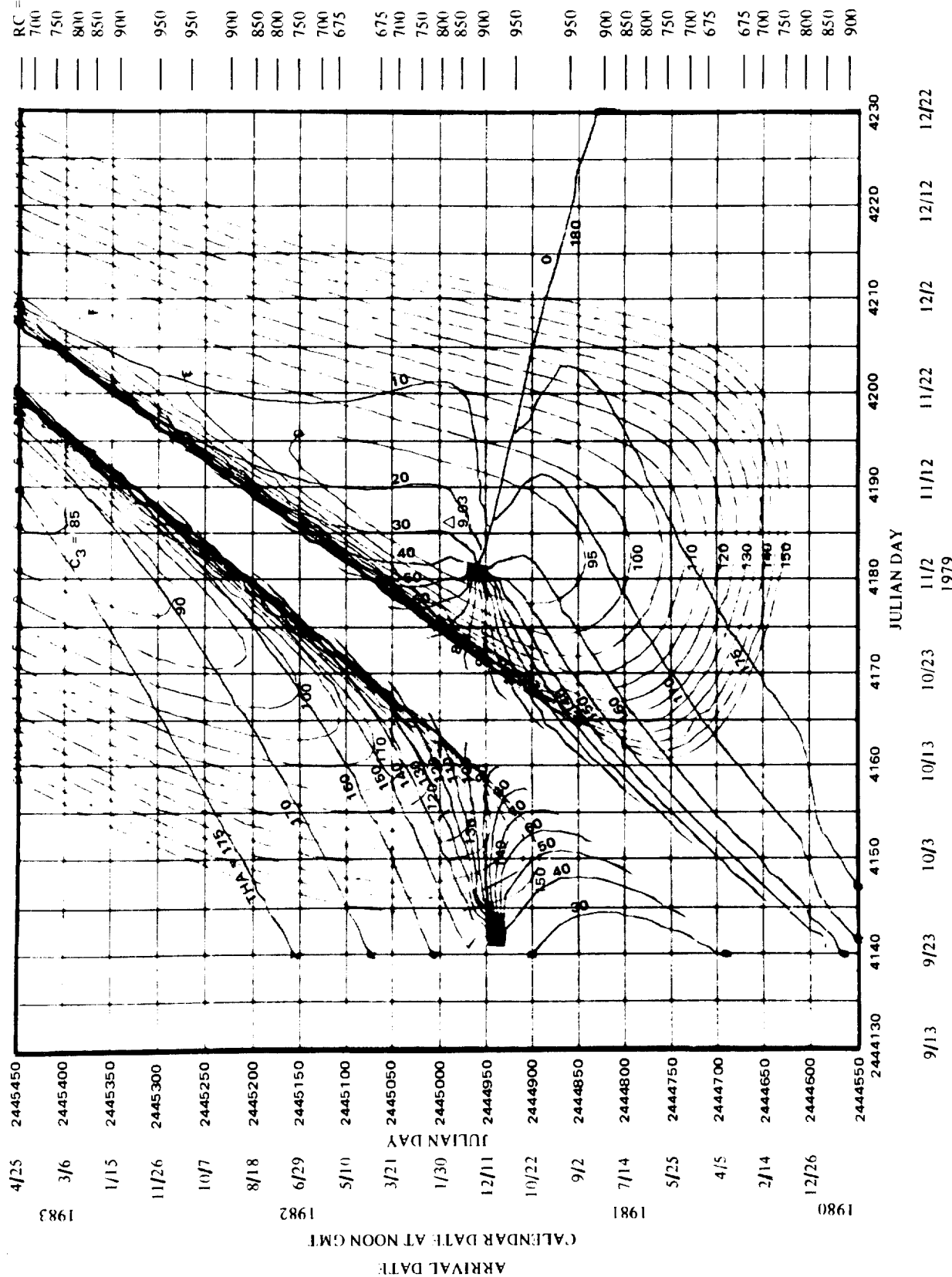
700 750 800 850 900 950 900 850 800 750 700 675 675 700 750 800 850 900 950 950 900 850 800 750 700 675 675 700 750 800 850 900



CONTOURS OF C<sub>3</sub> AND ETE EARTH TO JUPITER 1979



RC = 675 x 10<sup>6</sup> km

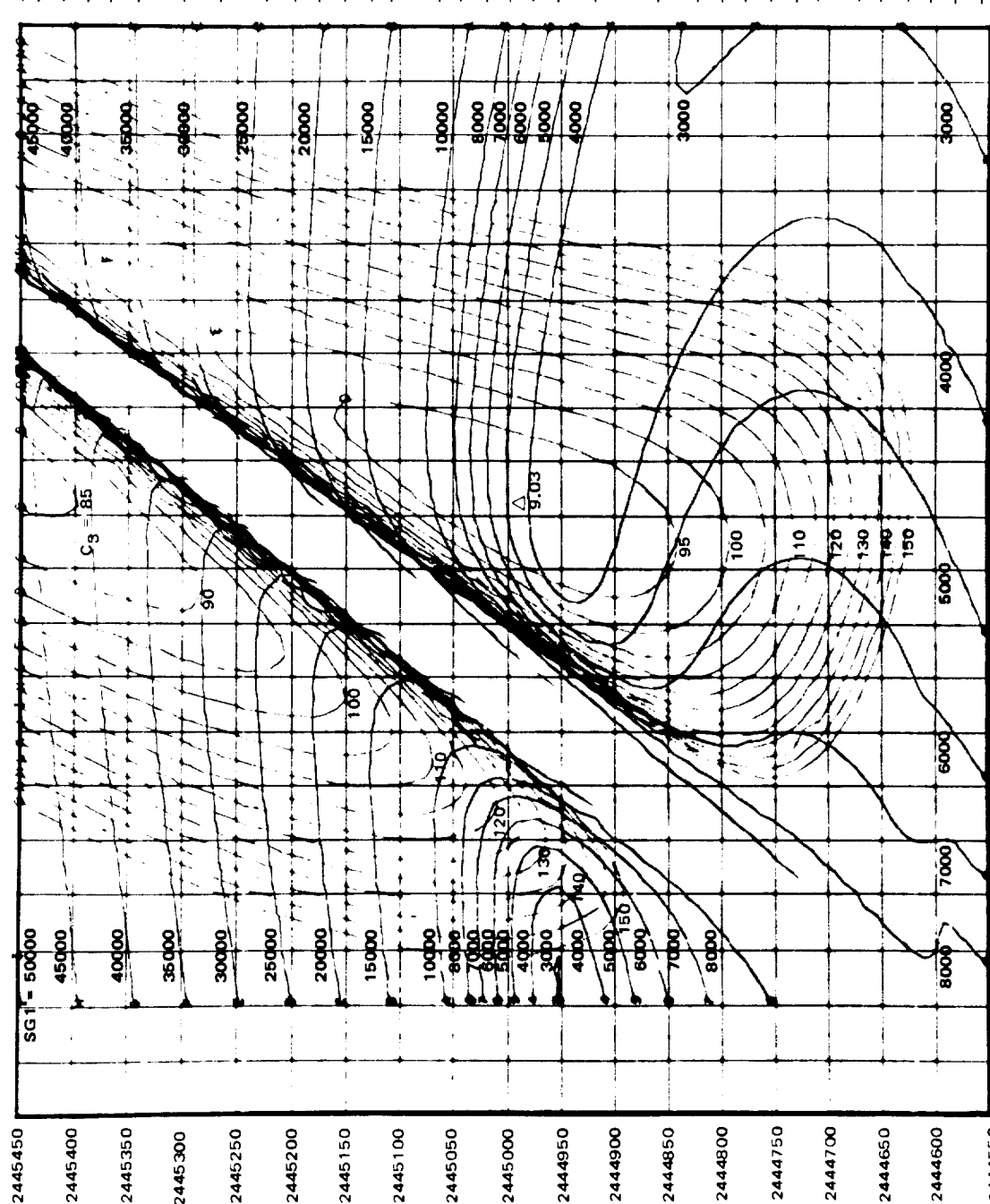


CALENDAR DATE AT NOON GMT  
1979

CONTOURS OF C<sub>3</sub> AND THA EARTH TO JUPITER 1979

RC = 675 x 10<sup>6</sup> km

700  
750  
800  
850  
900  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900



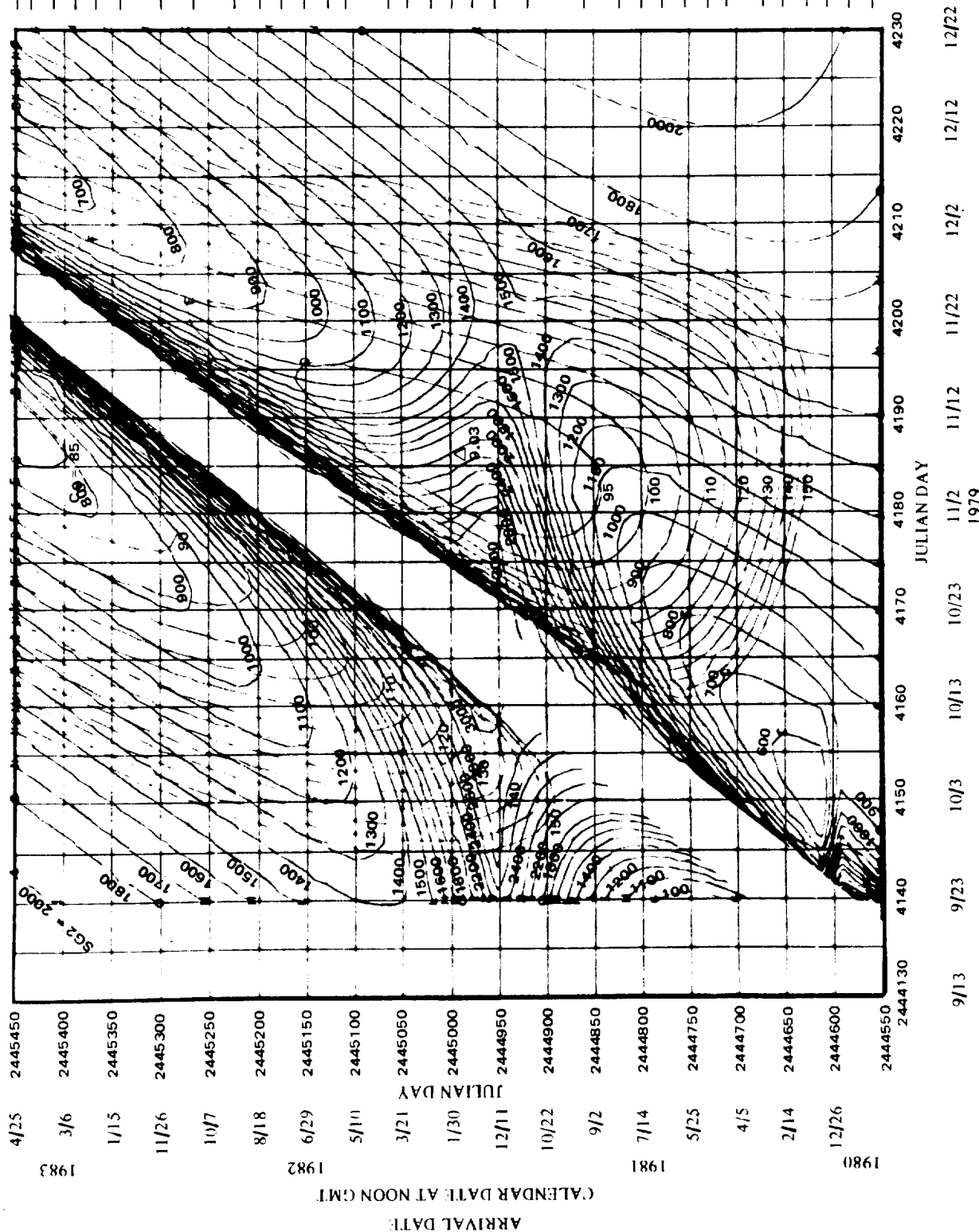
4/25 2445450  
3/6 2445400  
1/15 2445350  
11/26 2445300  
10/7 2445250  
8/18 2445200  
6/29 2445150  
5/10 2445100  
3/21 2445050  
1/30 2445000  
12/11 2444950  
10/22 2444900  
9/2 2444850  
7/14 2444800  
5/25 2444750  
4/5 2444700  
2/14 2444650  
12/26 2444600

CALENDAR DATE AT NOON GMT  
1979  
DEPARTURE DATE

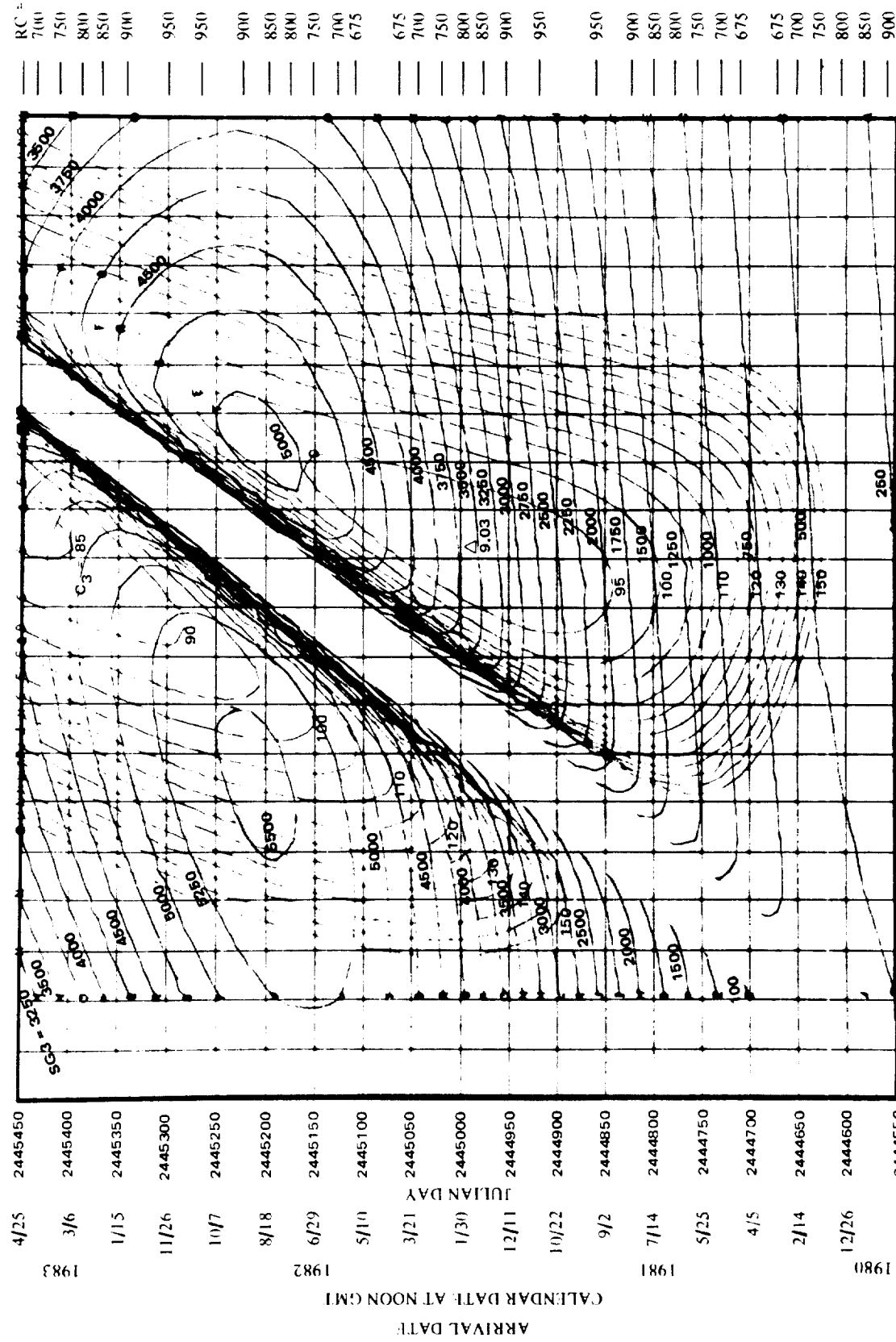
CONTOURS OF  $C_3$  AND  $SG_1$  EARTH TO JUPITER 1979

RC =  $675 \times 10^6$  km

700 750 800 850 900 950 675 700 750 800 850 900 950 675 700 750 800 850 900 950 675 700 750 800 850 900 950



RC = 675 x 10<sup>6</sup> km

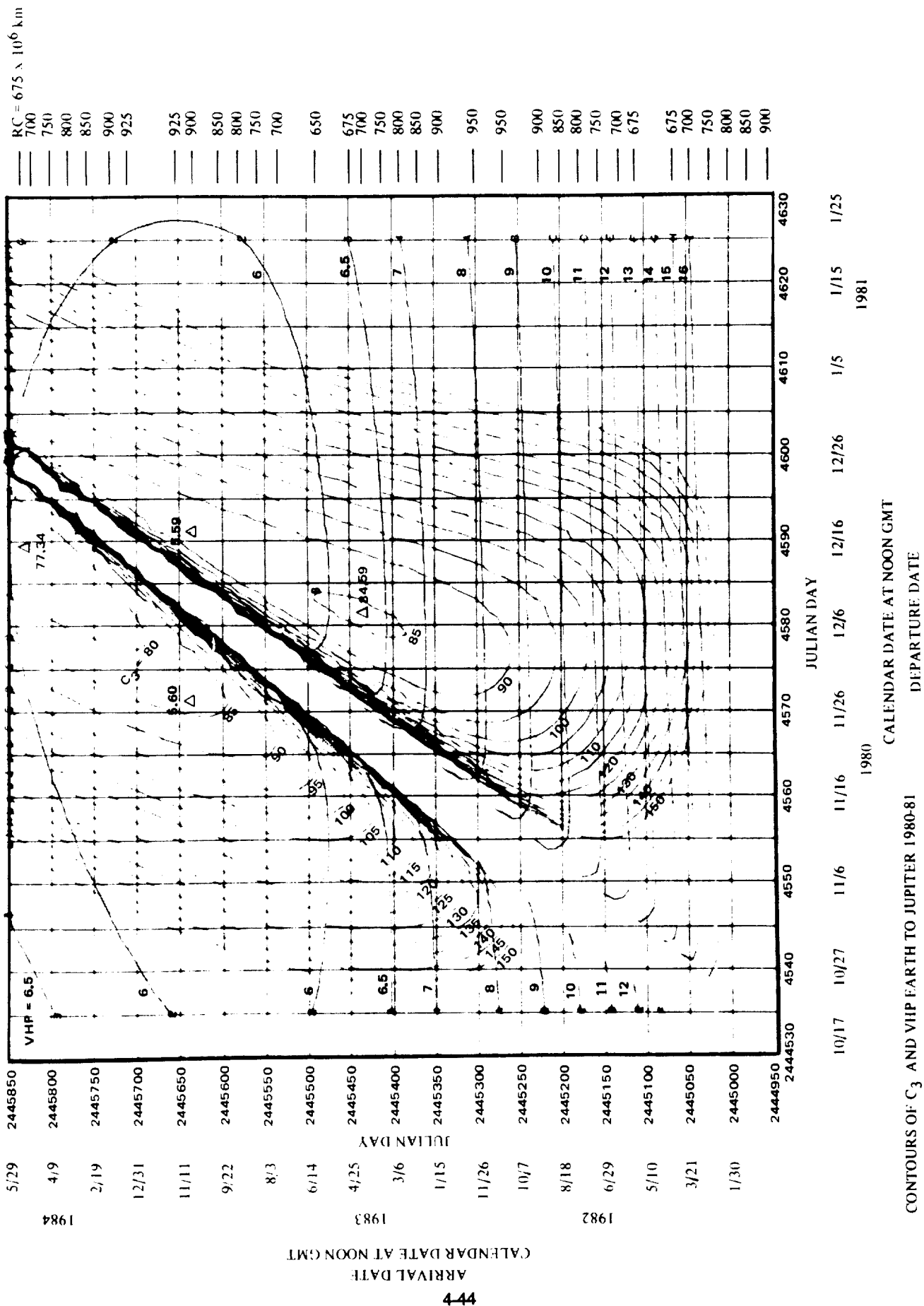


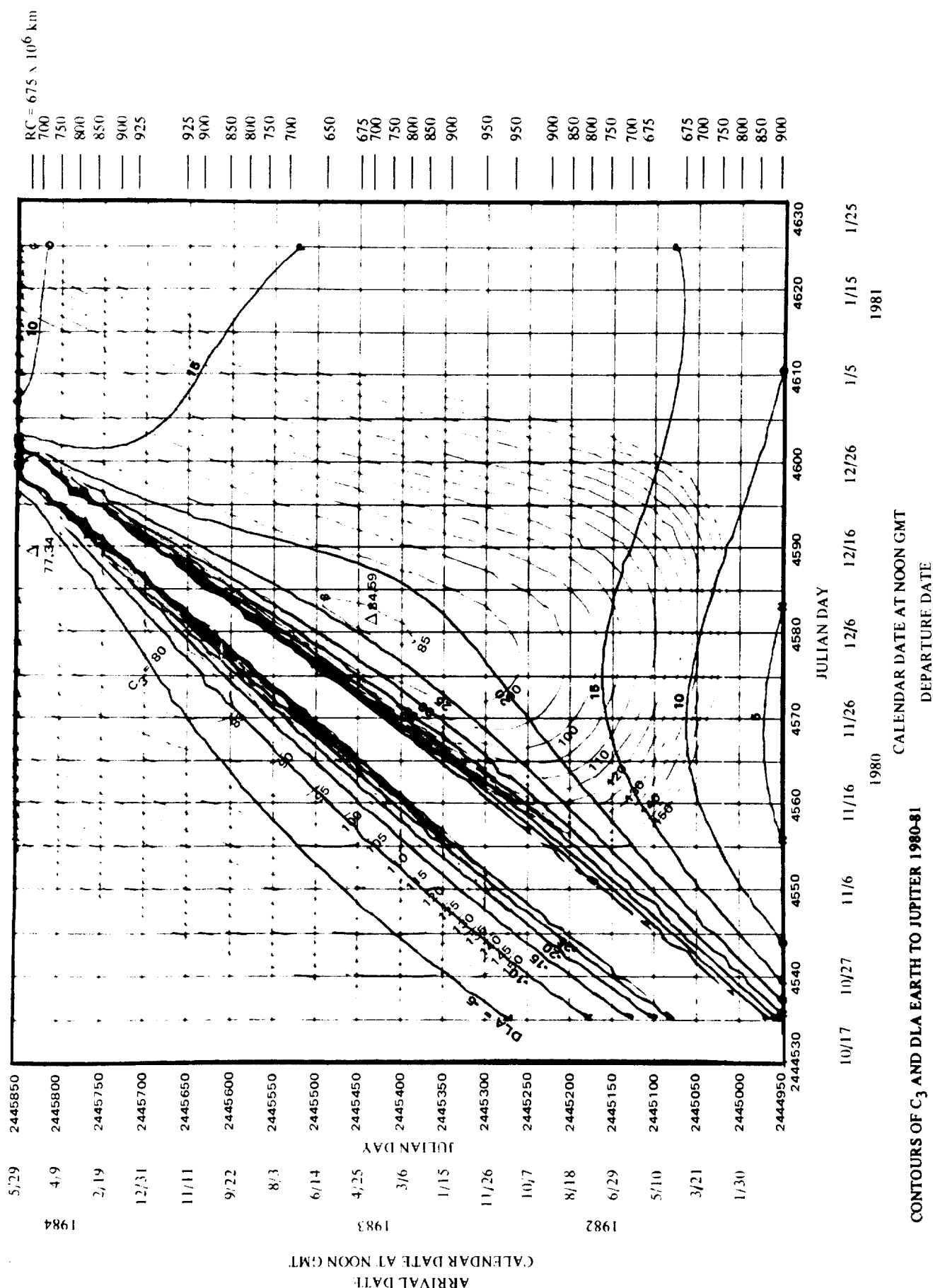
CALENDAR DATE AT NOON GMT

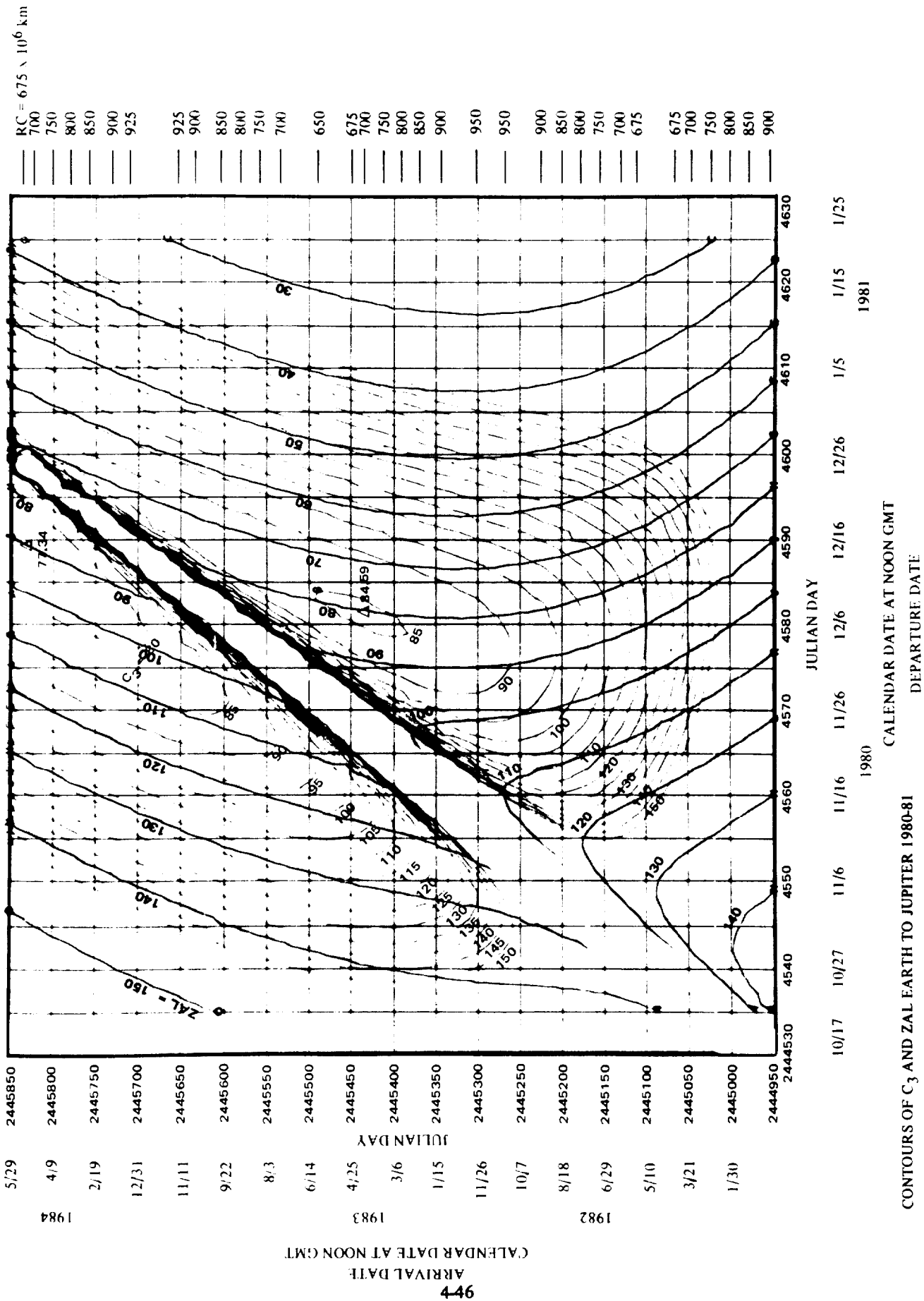
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND SG3 EARTH TO JUPITER 1979



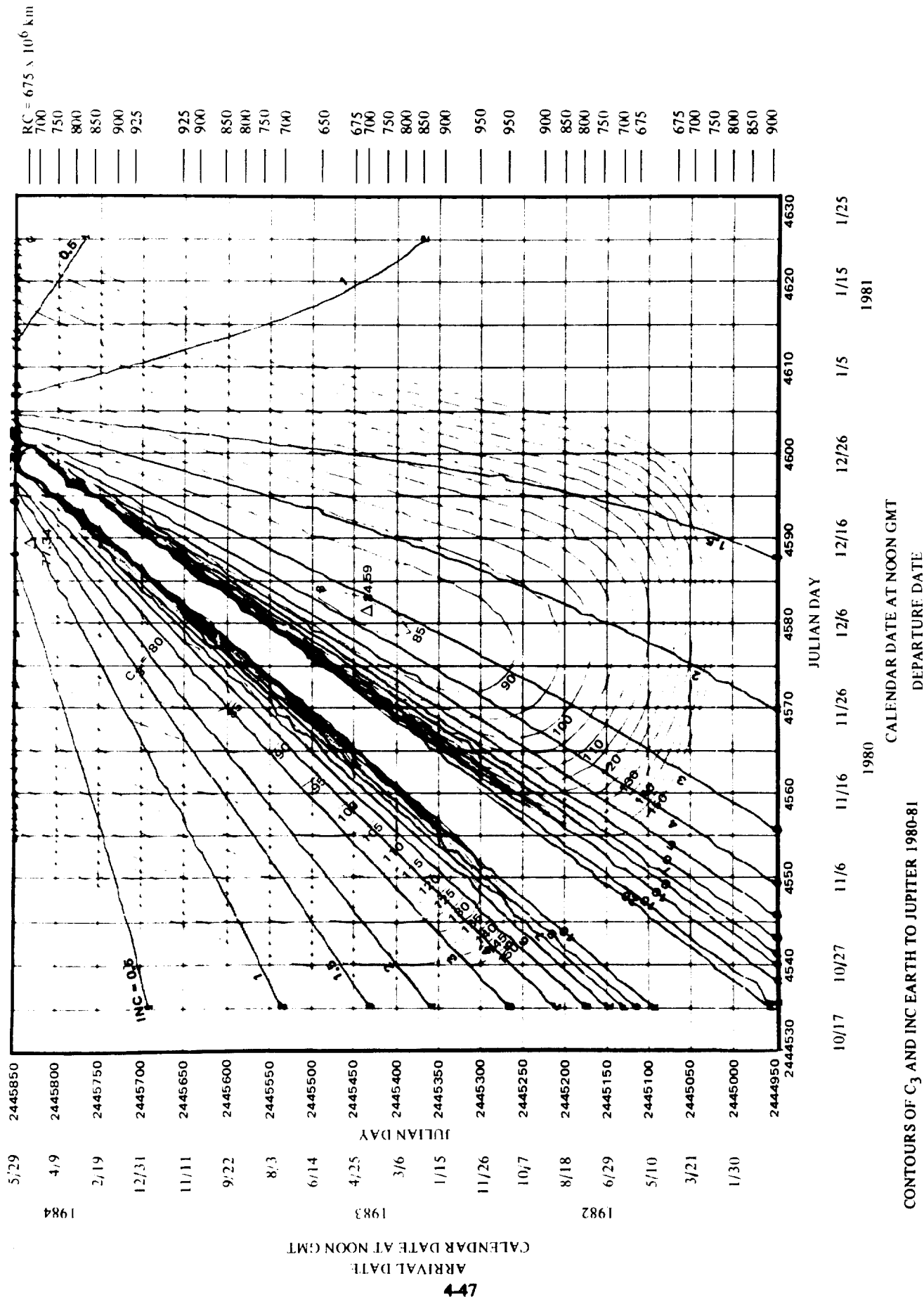


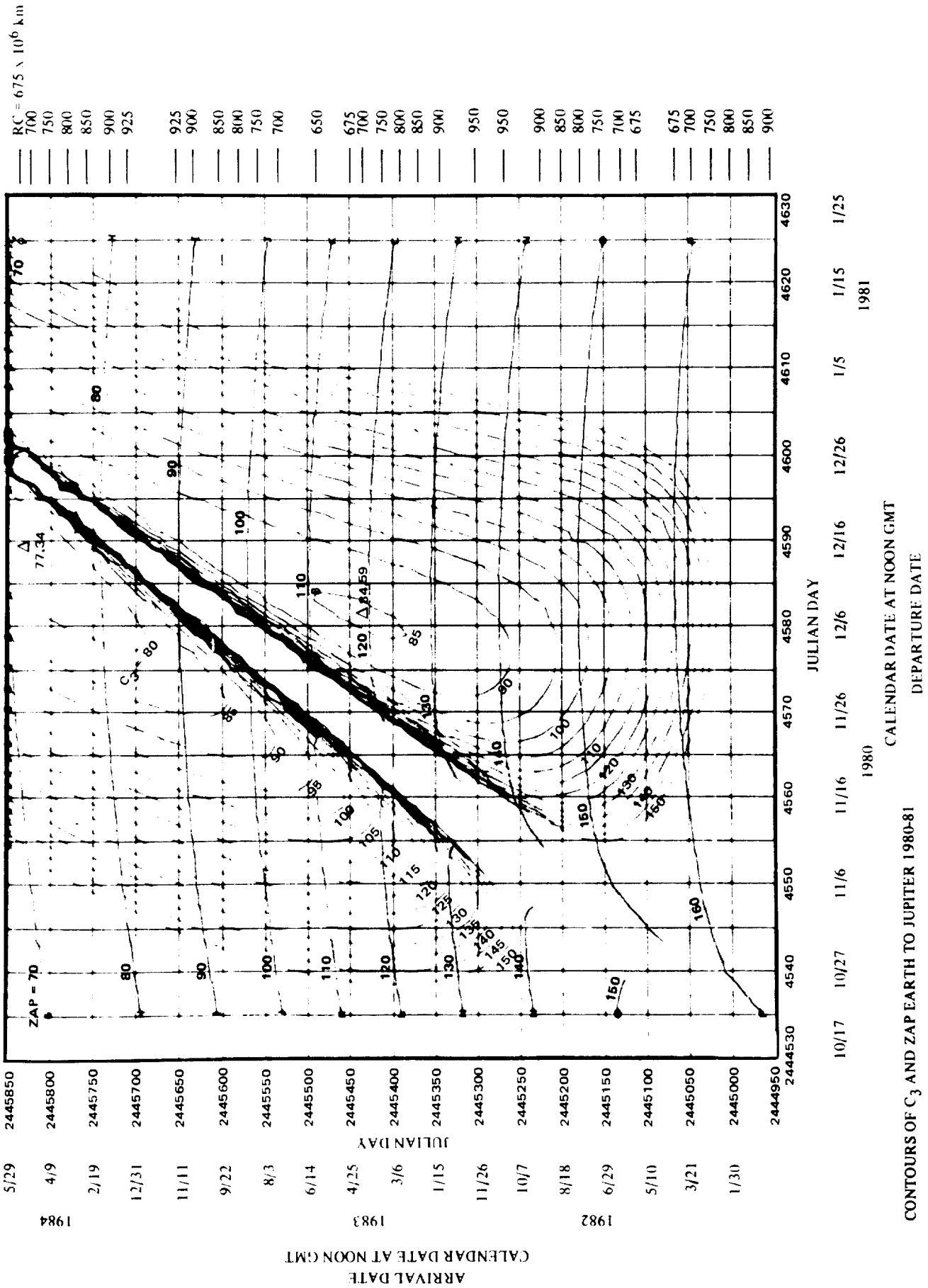


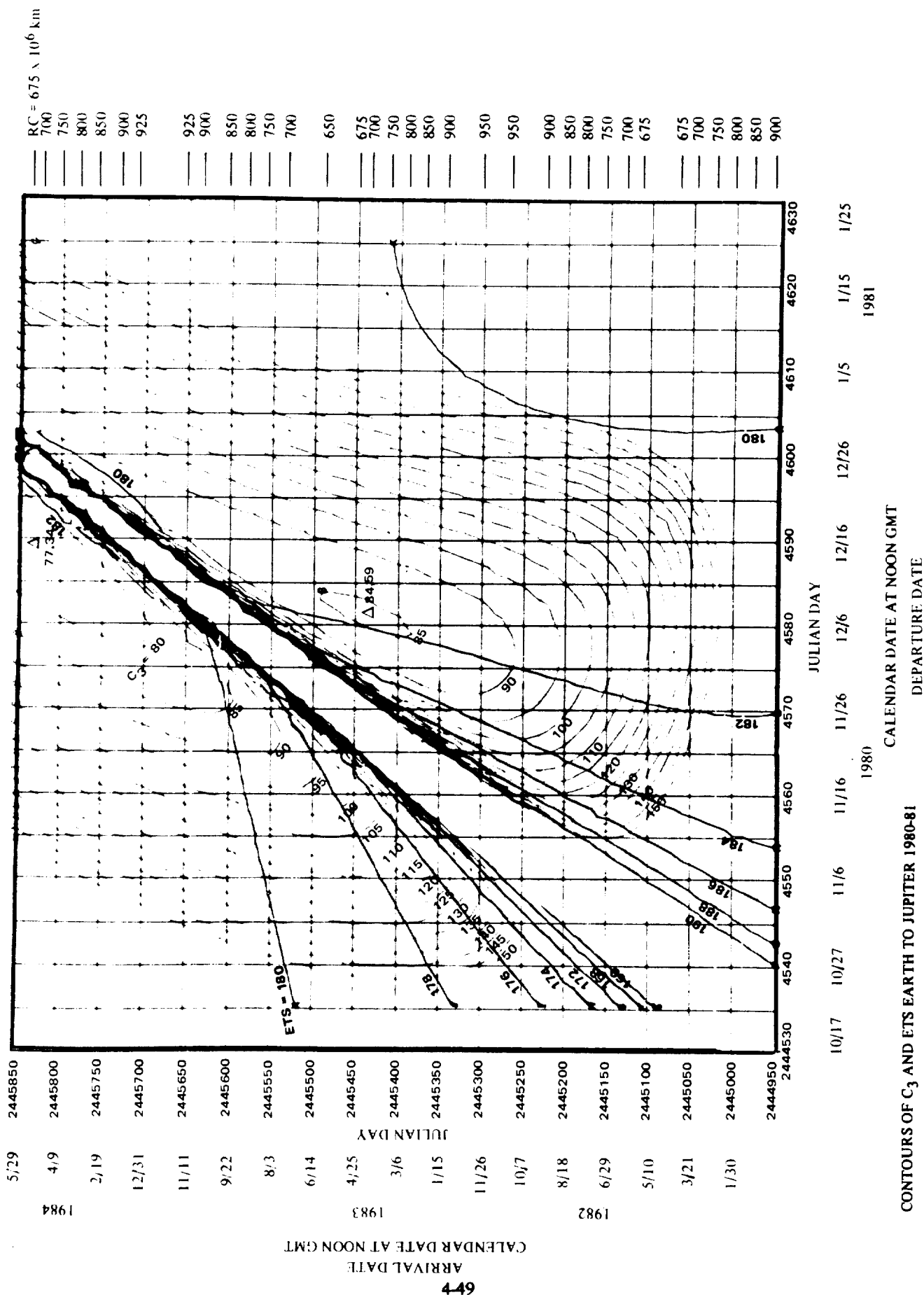


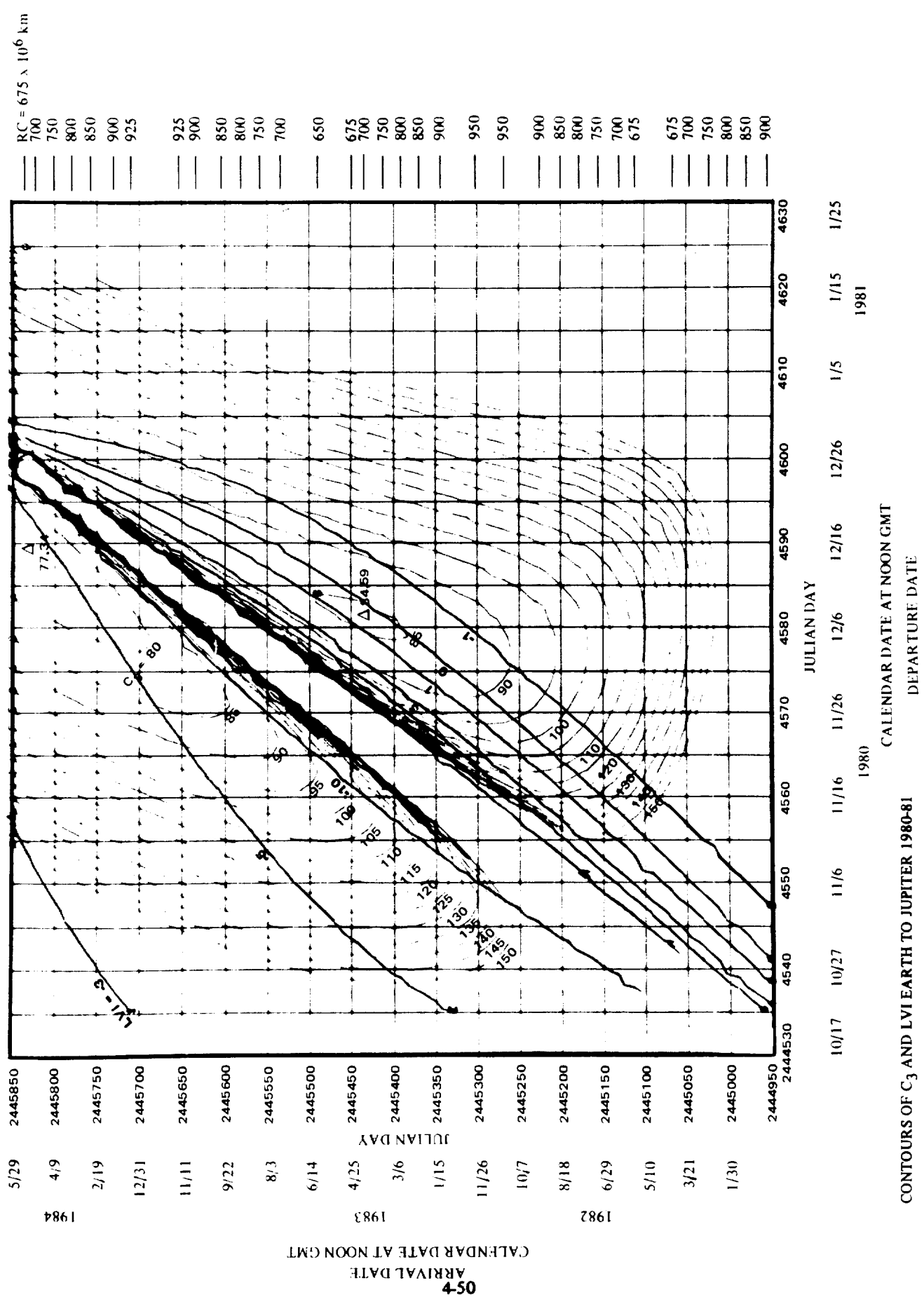
CONTOURS OF C<sub>3</sub> AND ZAL EARTH TO JUPITER 1980-81



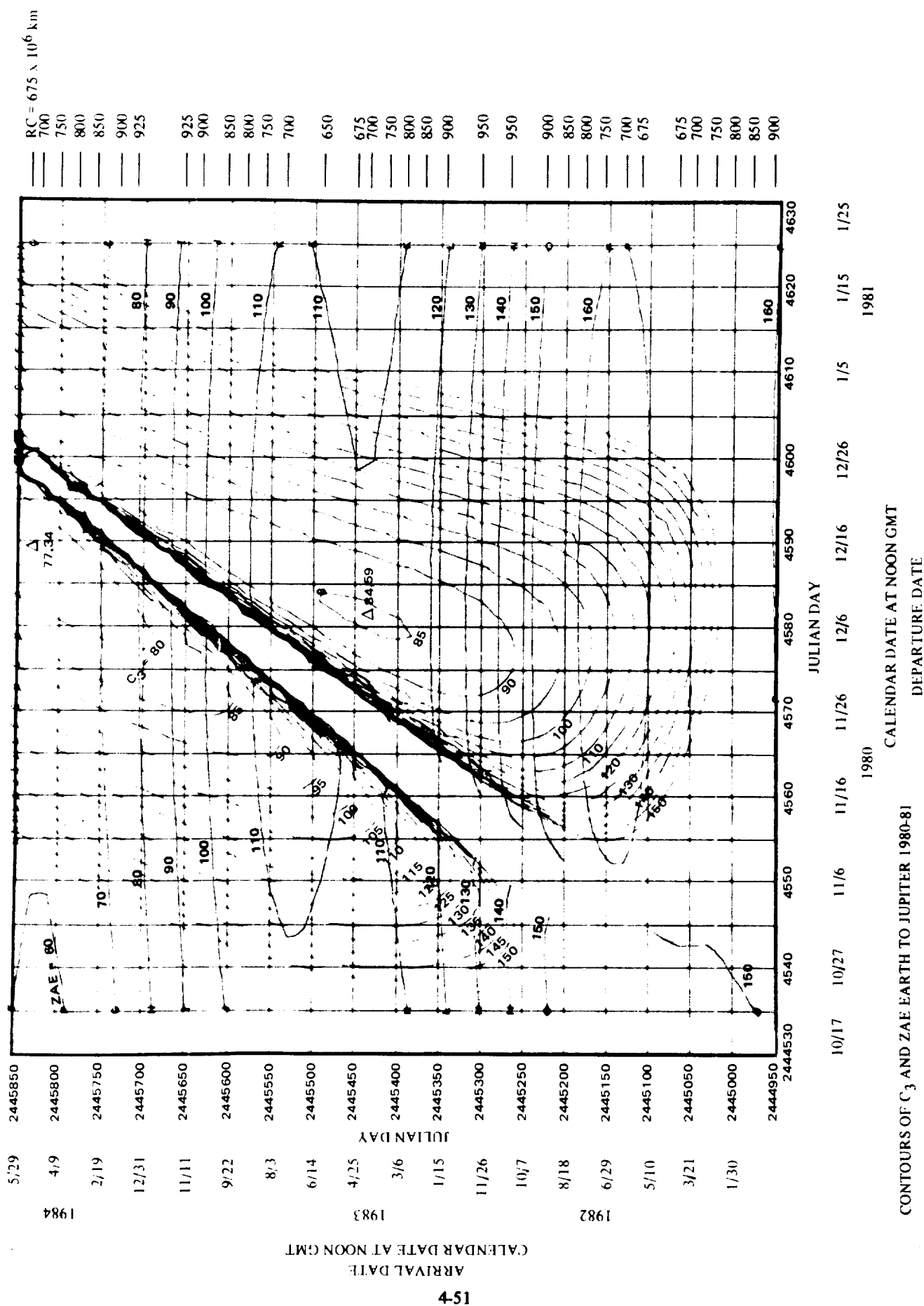


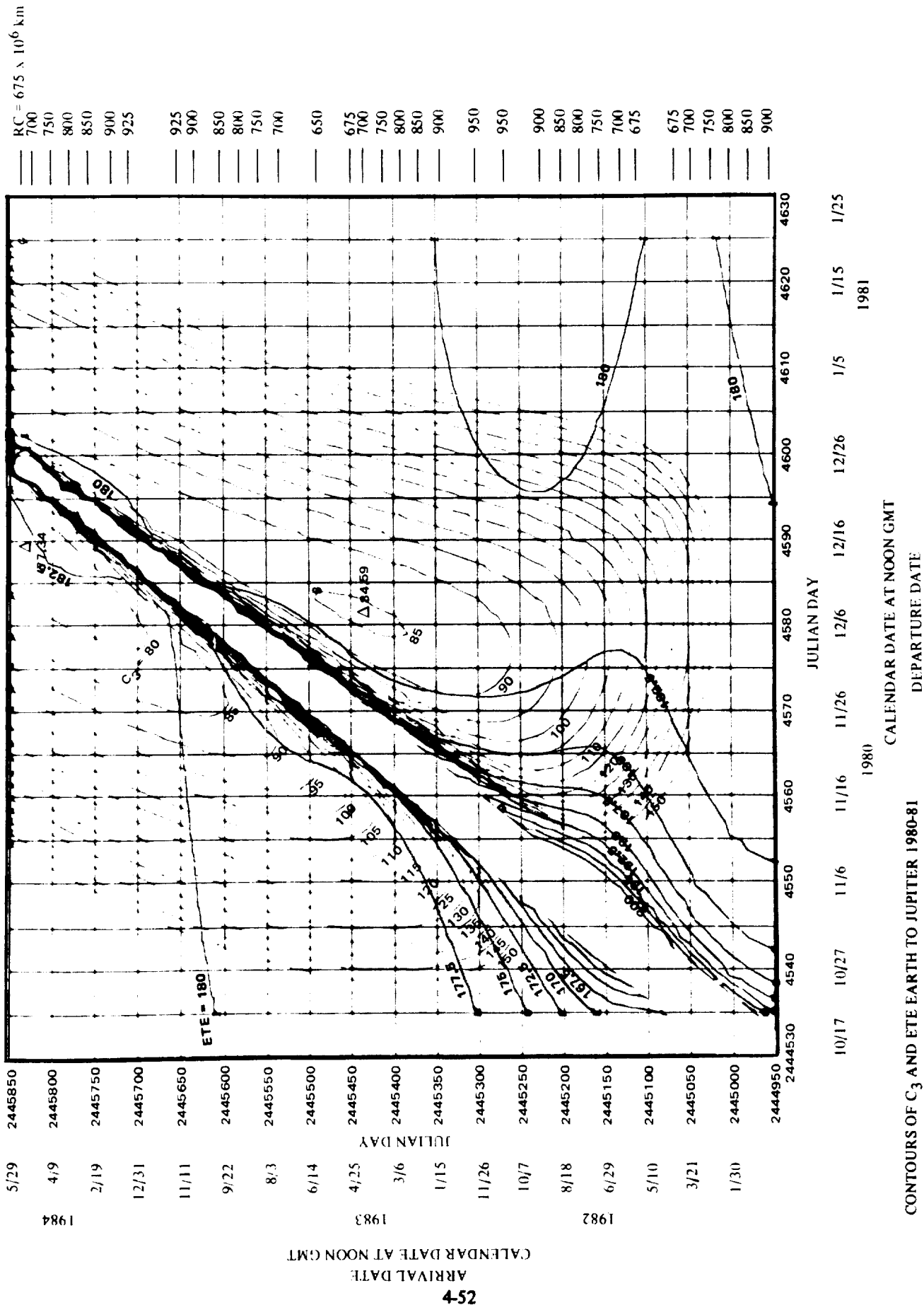


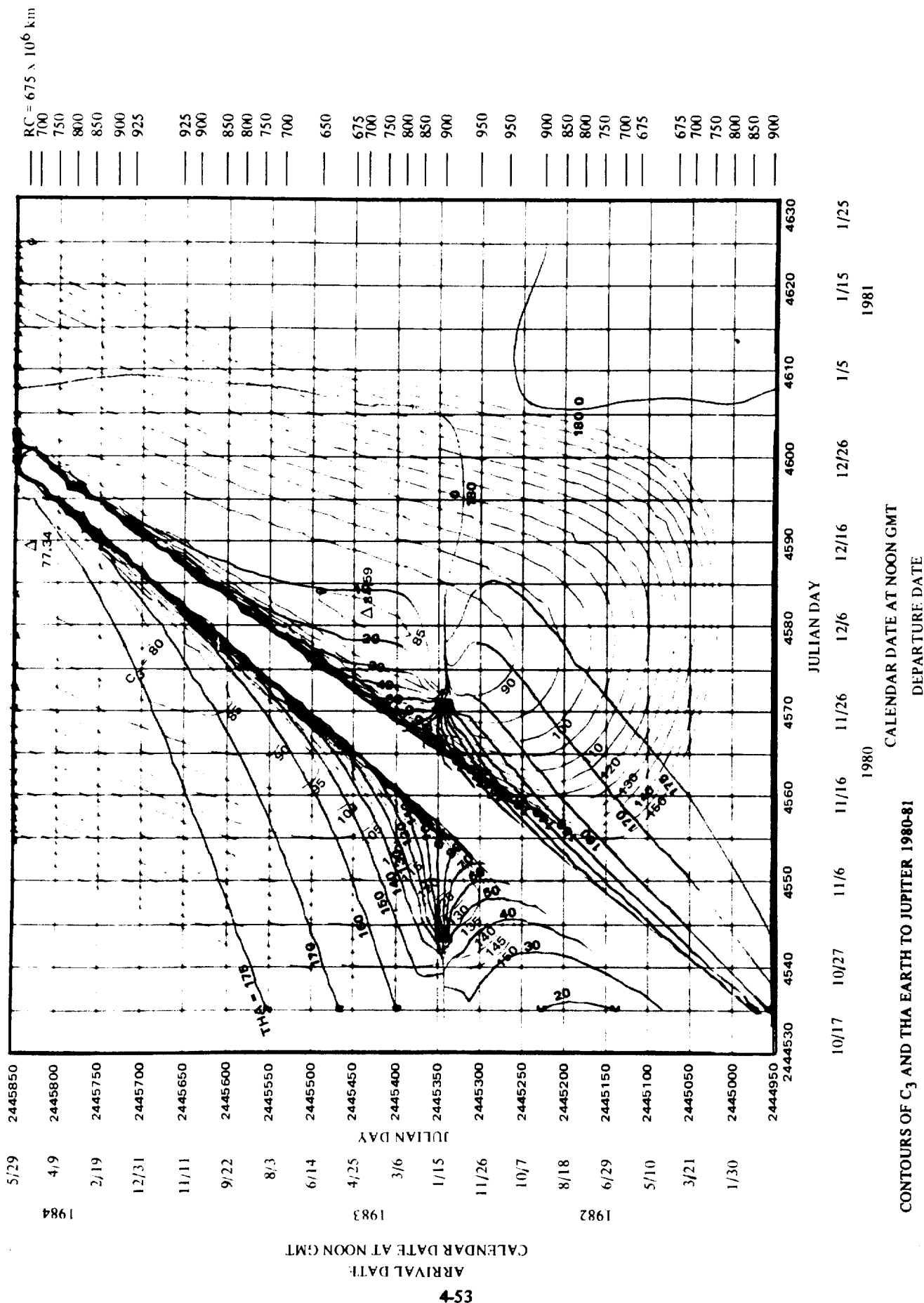


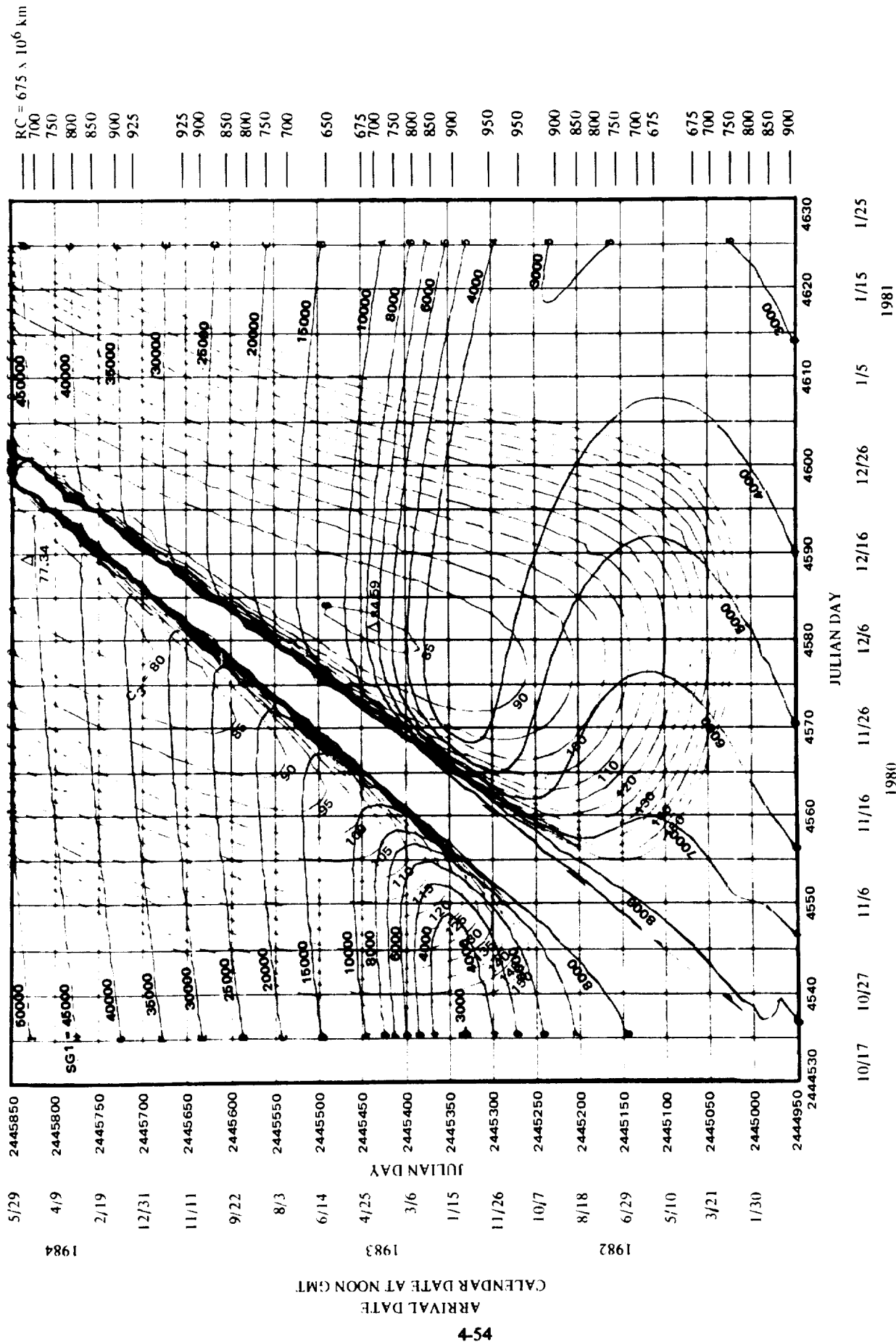


CONTOURS OF C<sub>3</sub> AND LV1 EARTH TO JUPITER 1980-81



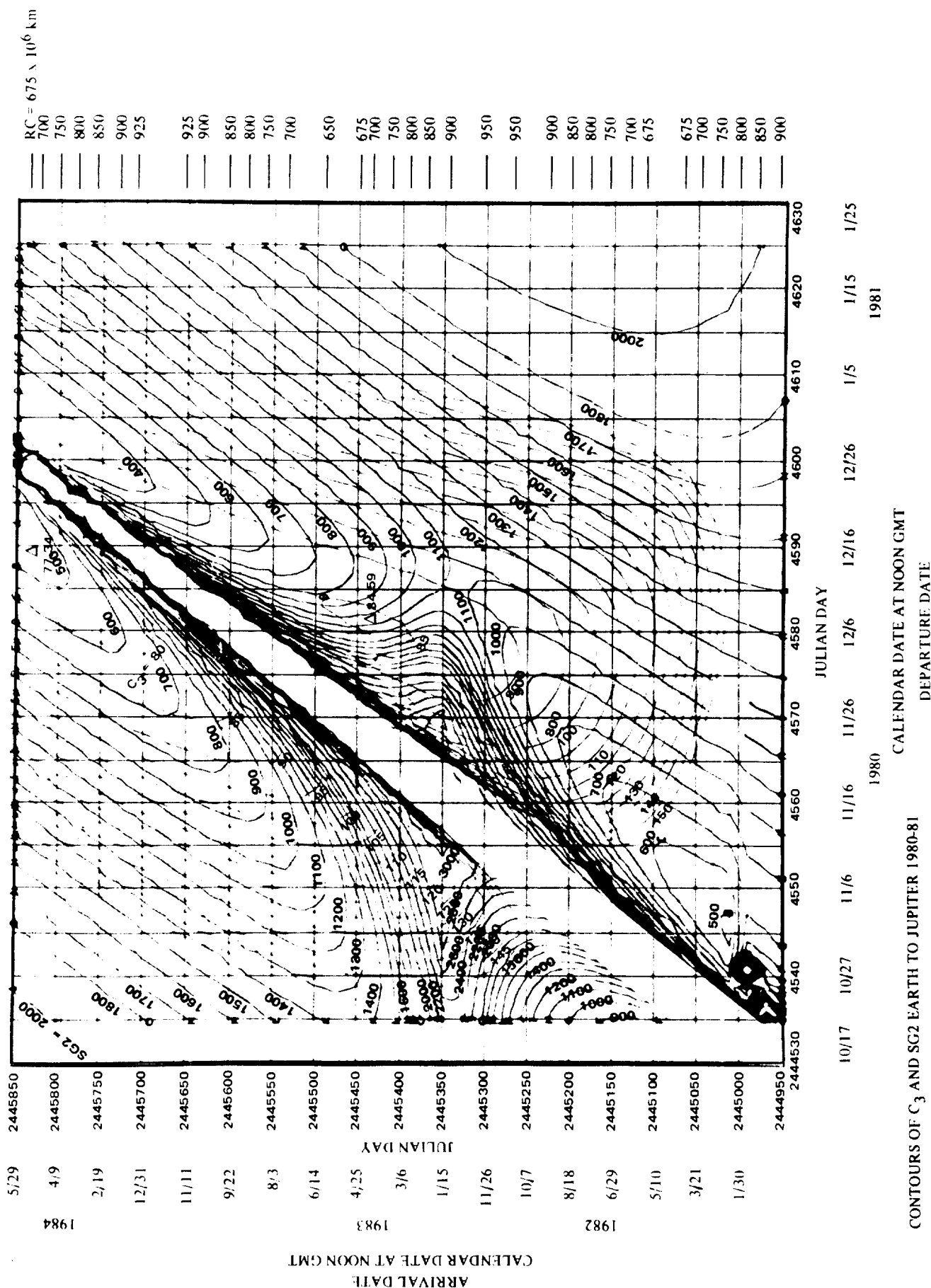


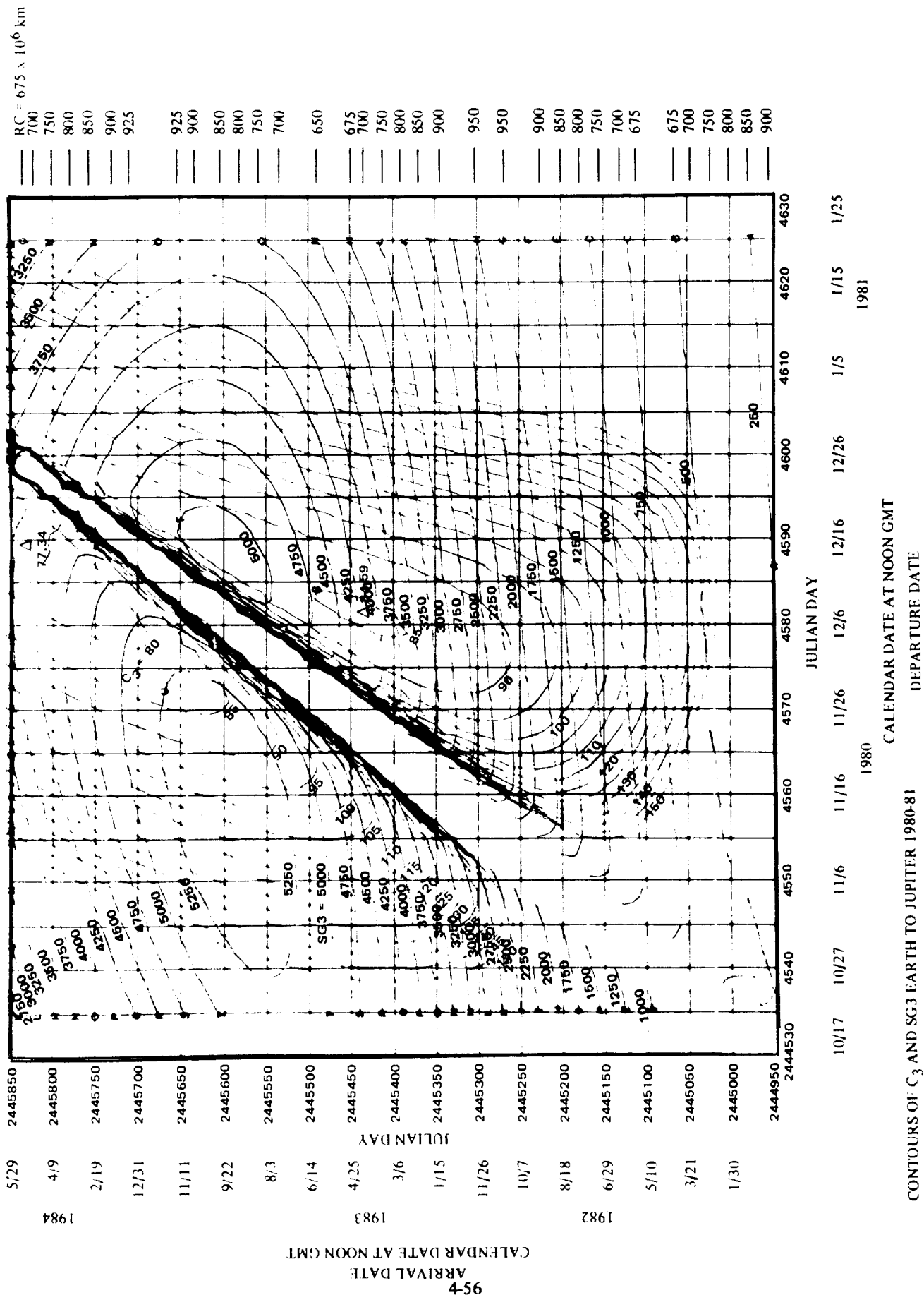


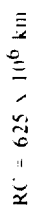


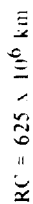
CONTOURS OF C<sub>3</sub> AND SG1 EARTH TO JUPITER 1980-81





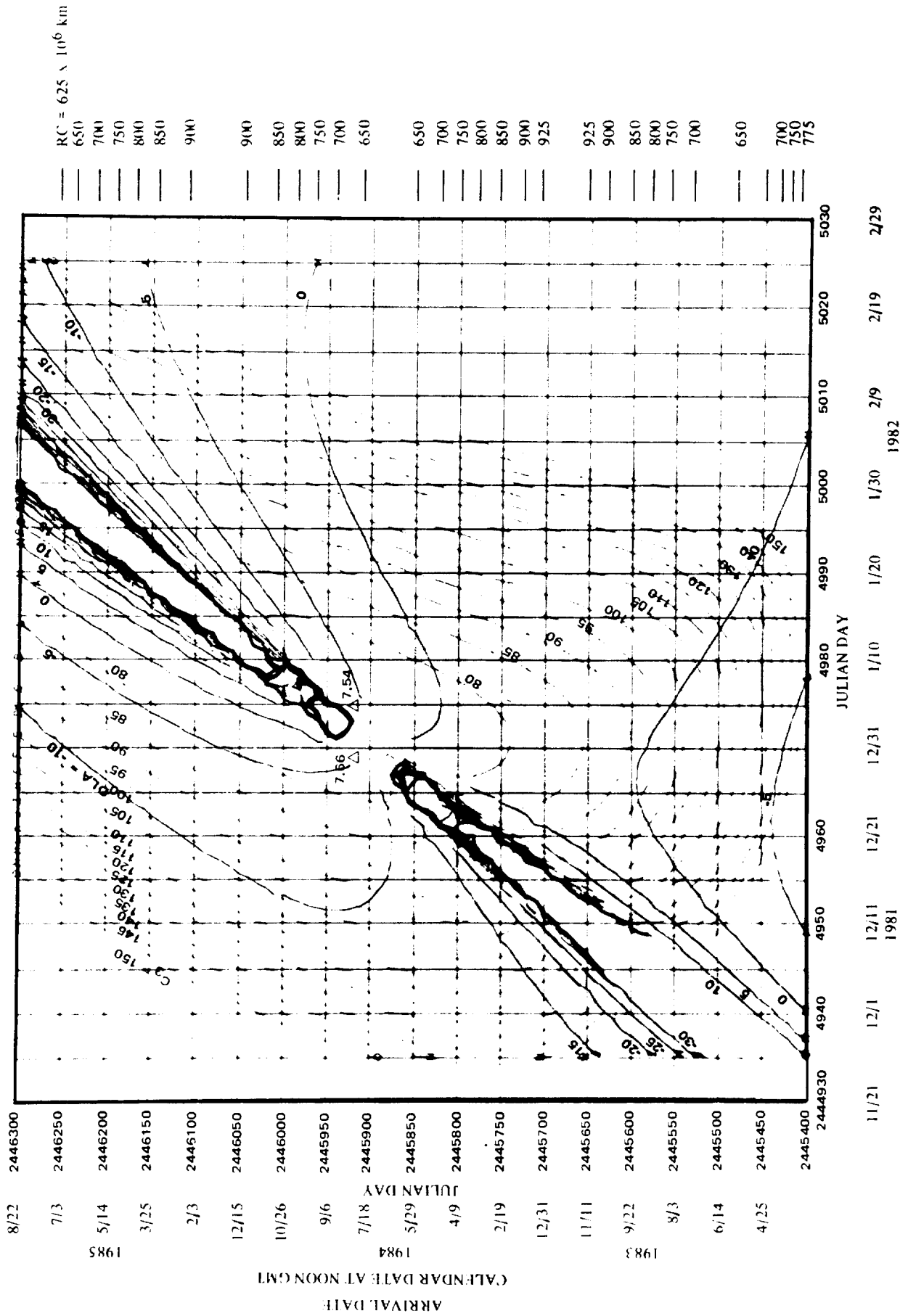




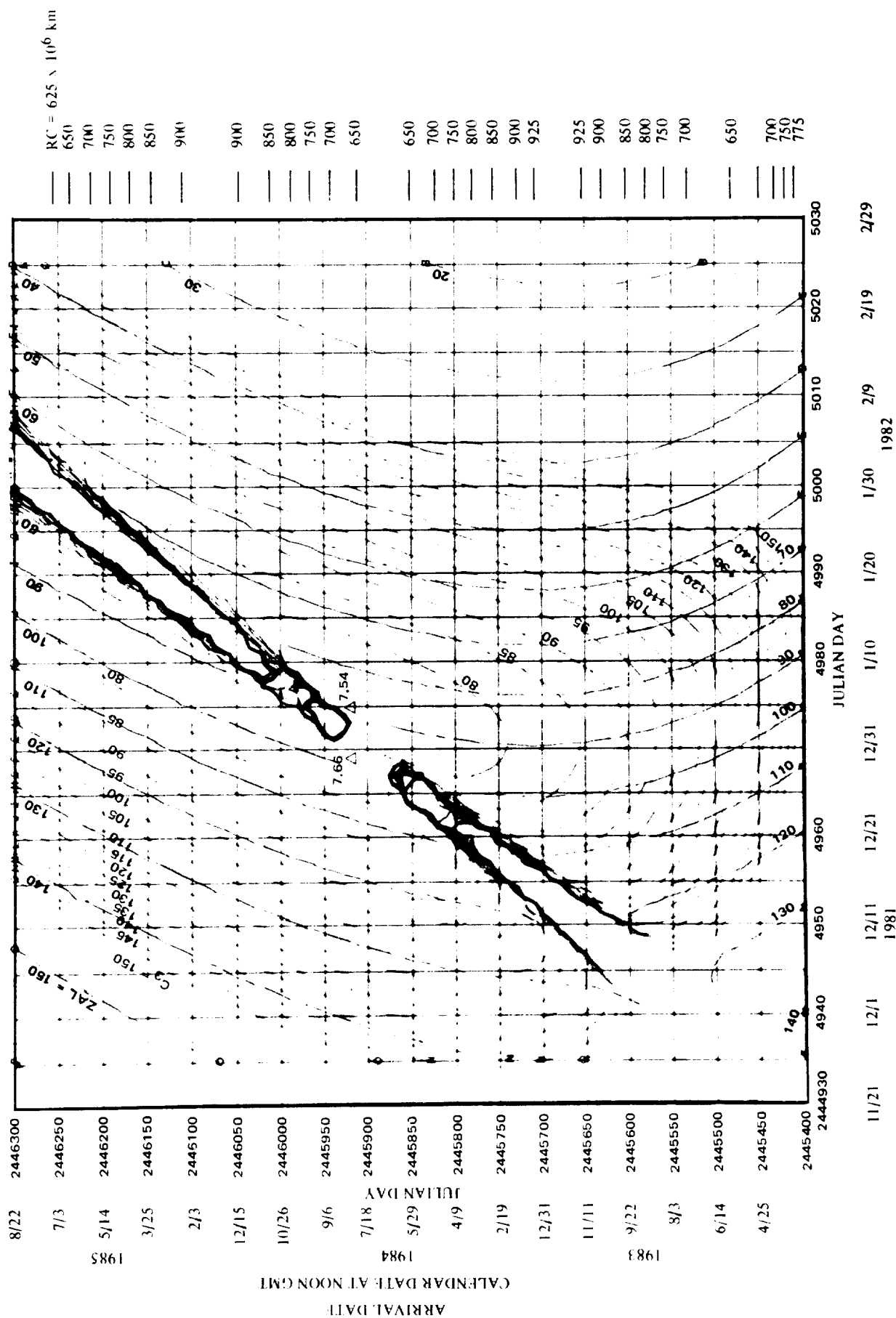


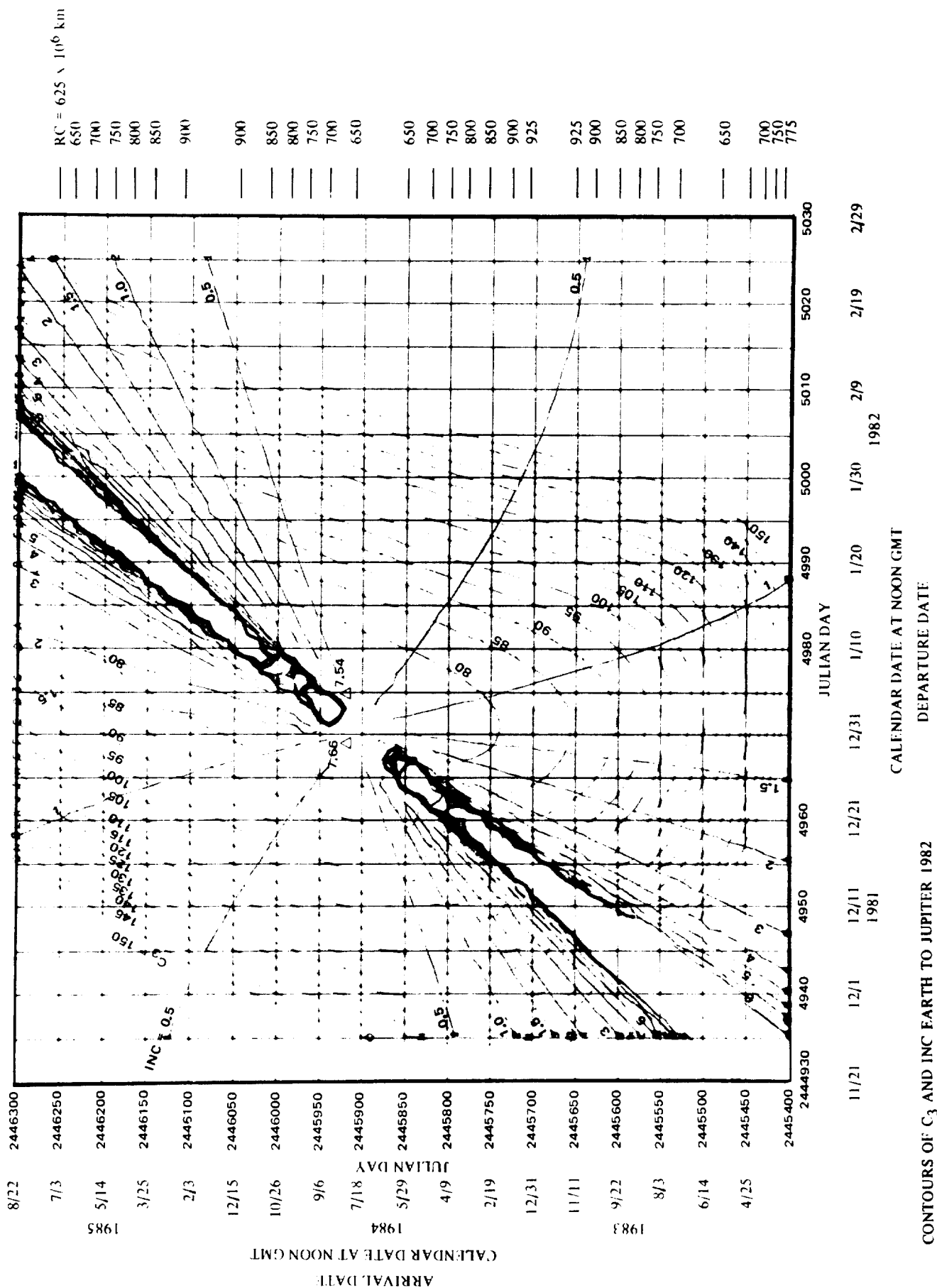
CONTOURS OF  $C_3$  AND VHP EARTH TO JUPITER 1982

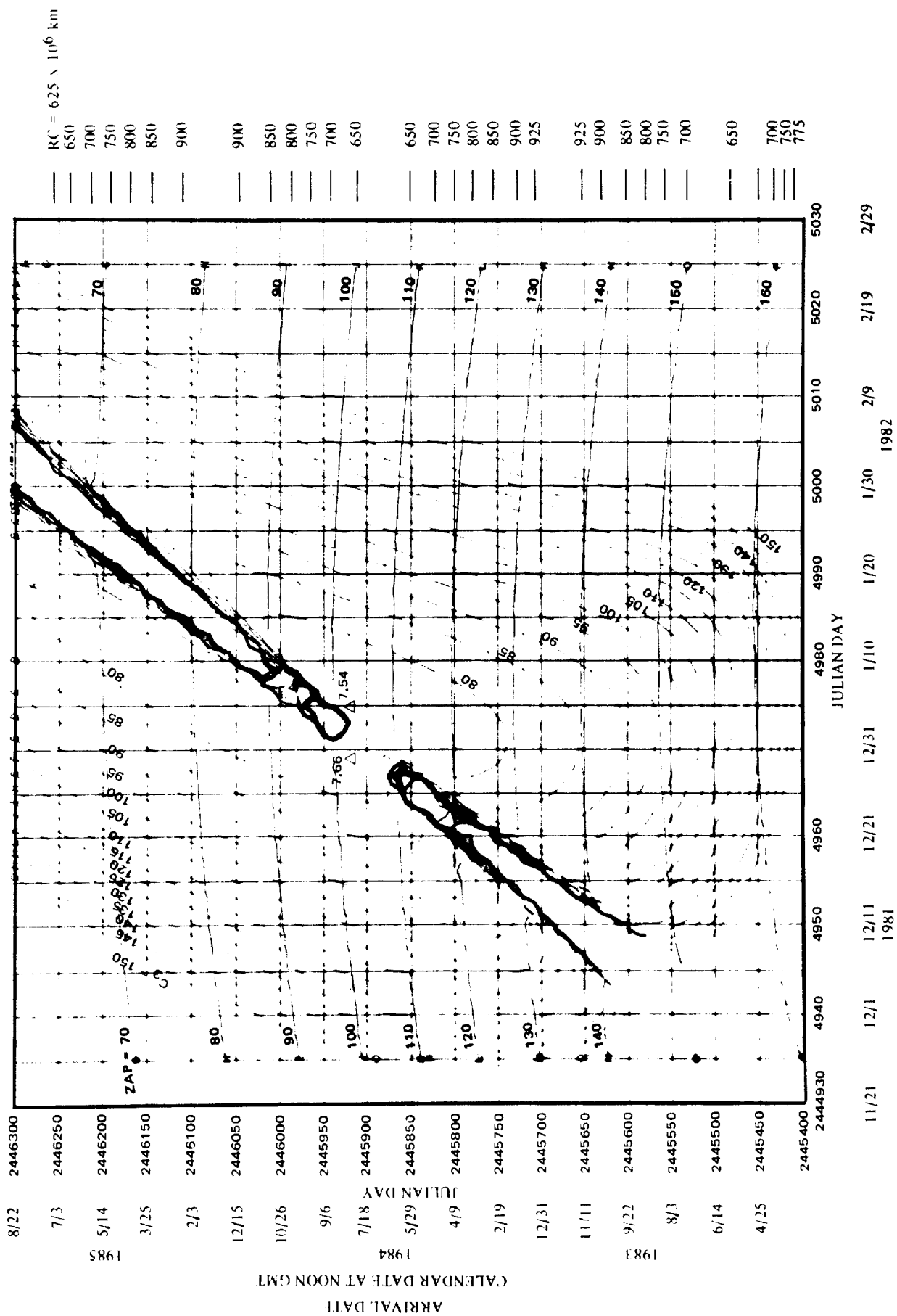
CALENDAR DATE AT NOON GMT	DEPARTURE DATE
1970-01-01	1970-01-01
1970-01-02	1970-01-02
1970-01-03	1970-01-03
1970-01-04	1970-01-04
1970-01-05	1970-01-05
1970-01-06	1970-01-06
1970-01-07	1970-01-07
1970-01-08	1970-01-08
1970-01-09	1970-01-09
1970-01-10	1970-01-10
1970-01-11	1970-01-11
1970-01-12	1970-01-12
1970-01-13	1970-01-13
1970-01-14	1970-01-14
1970-01-15	1970-01-15
1970-01-16	1970-01-16
1970-01-17	1970-01-17
1970-01-18	1970-01-18
1970-01-19	1970-01-19
1970-01-20	1970-01-20
1970-01-21	1970-01-21
1970-01-22	1970-01-22
1970-01-23	1970-01-23
1970-01-24	1970-01-24
1970-01-25	1970-01-25
1970-01-26	1970-01-26
1970-01-27	1970-01-27
1970-01-28	1970-01-28
1970-01-29	1970-01-29
1970-01-30	1970-01-30
1970-01-31	1970-01-31
1970-02-01	1970-02-01
1970-02-02	1970-02-02
1970-02-03	1970-02-03
1970-02-04	1970-02-04
1970-02-05	1970-02-05
1970-02-06	1970-02-06
1970-02-07	1970-02-07
1970-02-08	1970-02-08
1970-02-09	1970-02-09
1970-02-10	1970-02-10
1970-02-11	1970-02-11
1970-02-12	1970-02-12
1970-02-13	1970-02-13
1970-02-14	1970-02-14
1970-02-15	1970-02-15
1970-02-16	1970-02-16
1970-02-17	1970-02-17
1970-02-18	1970-02-18
1970-02-19	1970-02-19
1970-02-20	1970-02-20
1970-02-21	1970-02-21
1970-02-22	1970-02-22
1970-02-23	1970-02-23
1970-02-24	1970-02-24
1970-02-25	1970-02-25
1970-02-26	1970-02-26
1970-02-27	1970-02-27
1970-02-28	1970-02-28
1970-03-01	1970-03-01
1970-03-02	1970-03-02
1970-03-03	1970-03-03
1970-03-04	1970-03-04
1970-03-05	1970-03-05
1970-03-06	1970-03-06
1970-03-07	1970-03-07
1970-03-08	1970-03-08
1970-03-09	1970-03-09
1970-03-10	1970-03-10
1970-03-11	1970-03-11
1970-03-12	1970-03-12
1970-03-13	1970-03-13
1970-03-14	1970-03-14
1970-03-15	1970-03-15
1970-03-16	1970-03-16
1970-03-17	1970-03-17
1970-03-18	1970-03-18
1970-03-19	1970-03-19
1970-03-20	1970-03-20
1970-03-21	1970-03-21
1970-03-22	1970-03-22
1970-03-23	1970-03-23
1970-03-24	1970-03-24
1970-03-25	1970-03-25
1970-03-26	1970-03-26
1970-03-27	1970-03-27
1970-03-28	1970-03-28
1970-03-29	1970-03-29
1970-03-30	1970-03-30
1970-03-31	1970-03-31
1970-04-01	1970-04-01
1970-04-02	1970-04-02
1970-04-03	1970-04-03
1970-04-04	1970-04-04
1970-04-05	1970-04-05
1970-04-06	1970-04-06
1970-04-07	1970-04-07
1970-04-08	1970-04-08
1970-04-09	1970-04-09
1970-04-10	1970-04-10
1970-04-11	1970-04-11
1970-04-12	1970-04-12
1970-04-13	1970-04-13
1970-04-14	1970-04-14



CONTOURS OF C<sub>3</sub> AND DLA EARTH TO JUPITER 1982







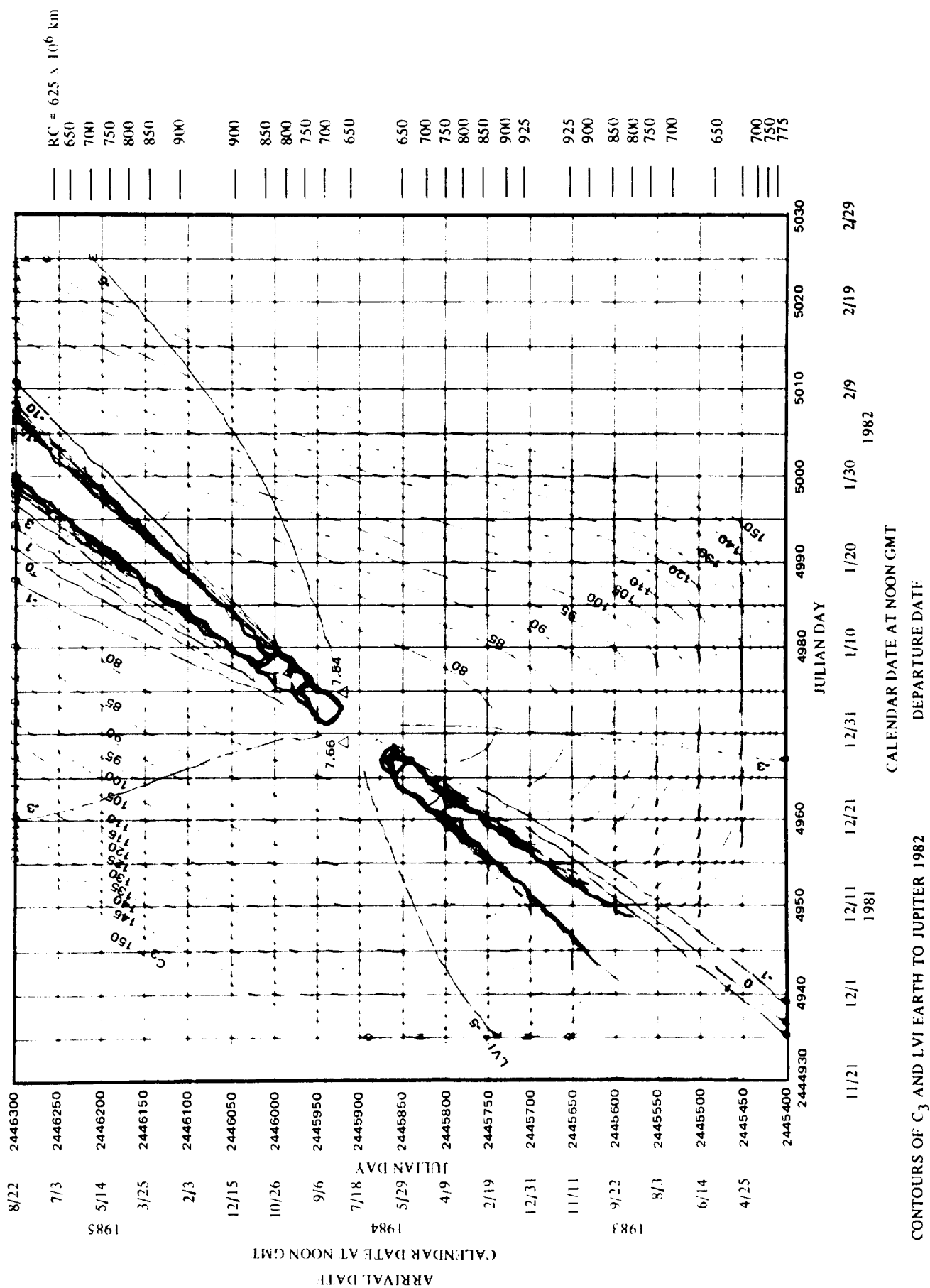
CONTOURS OF  $C_3$  AND ZAP EARTH TO JUPITER 1982

CALENDAR DATE AT NOON GMT

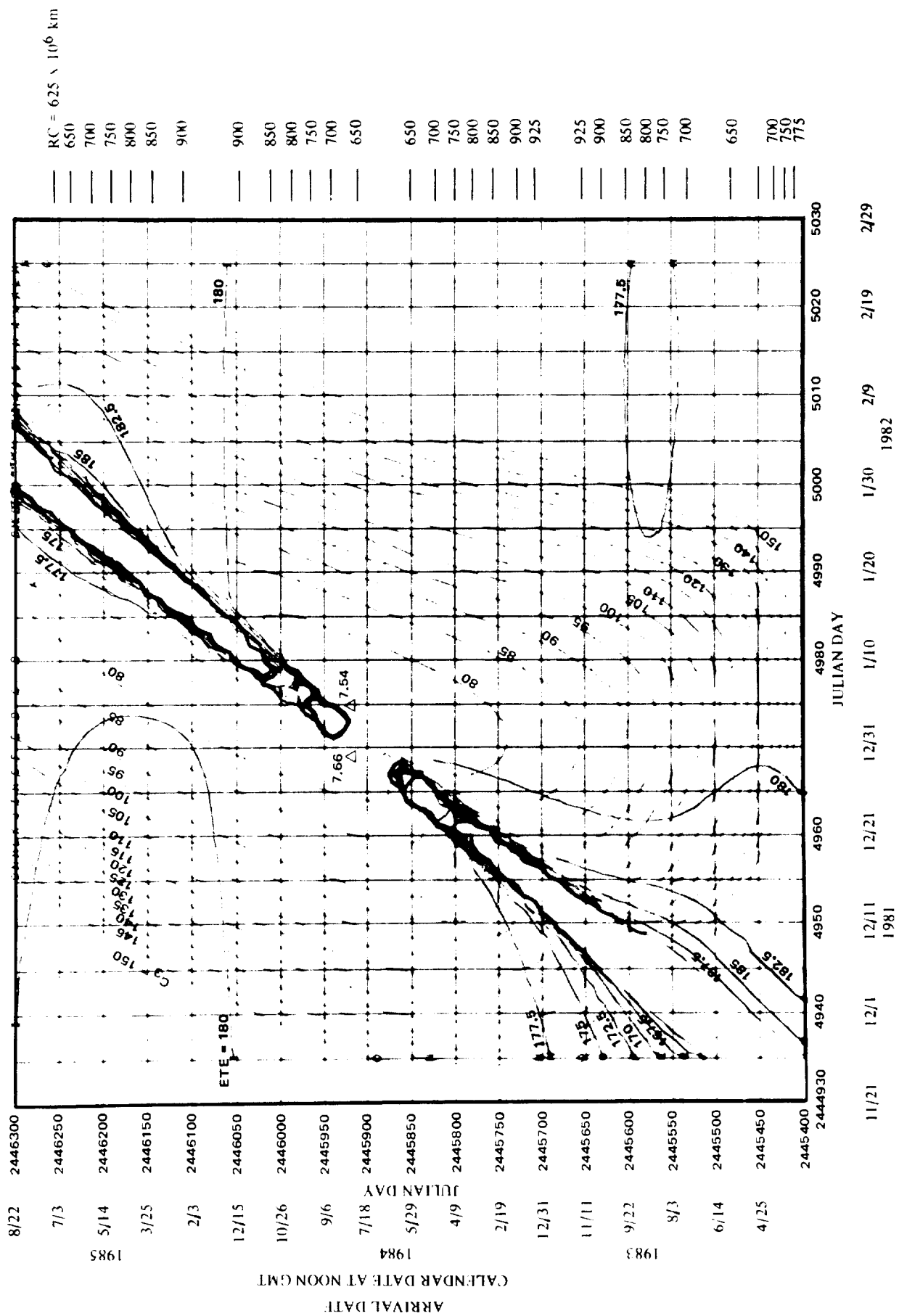
DEPARTURE DATE:

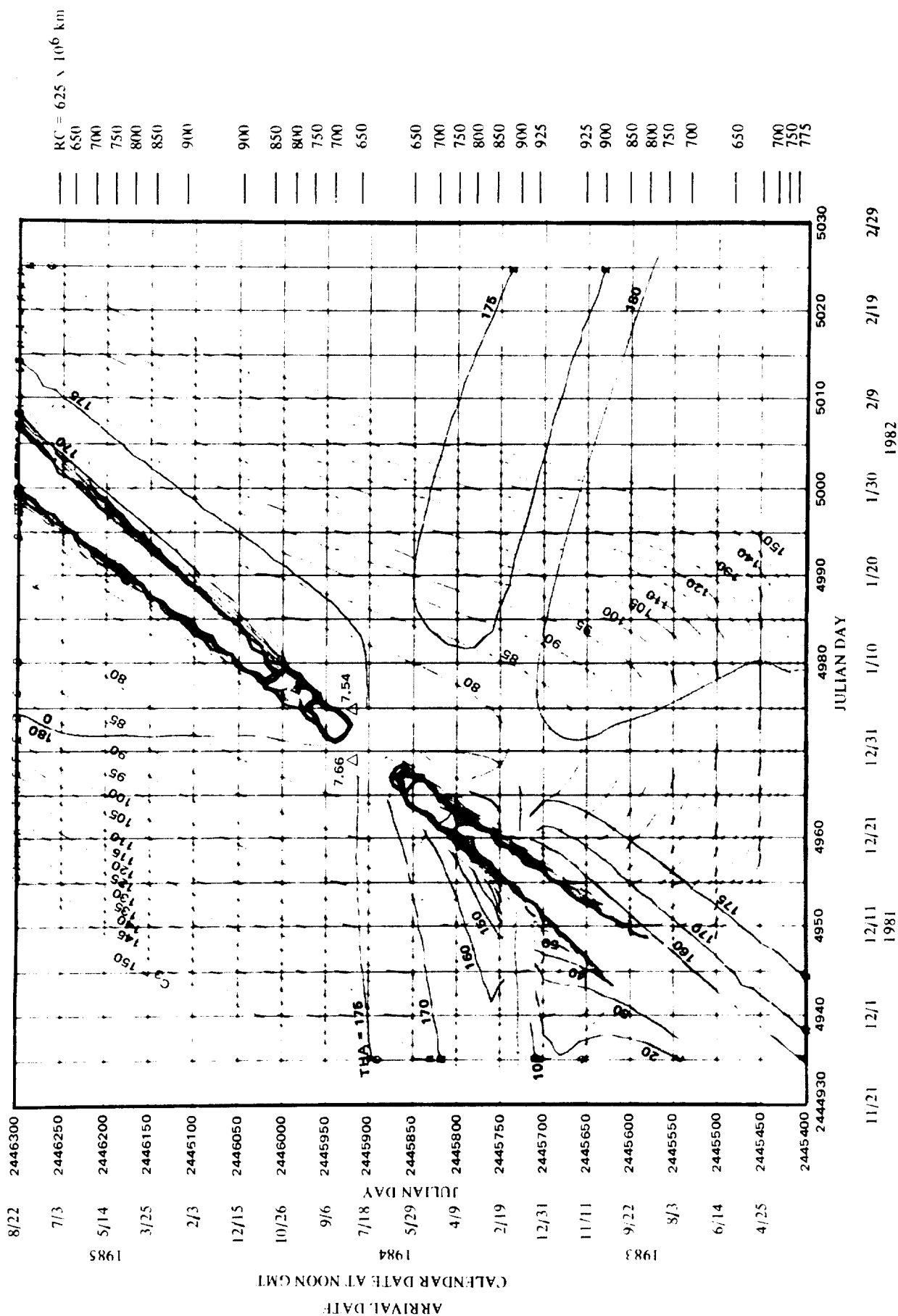


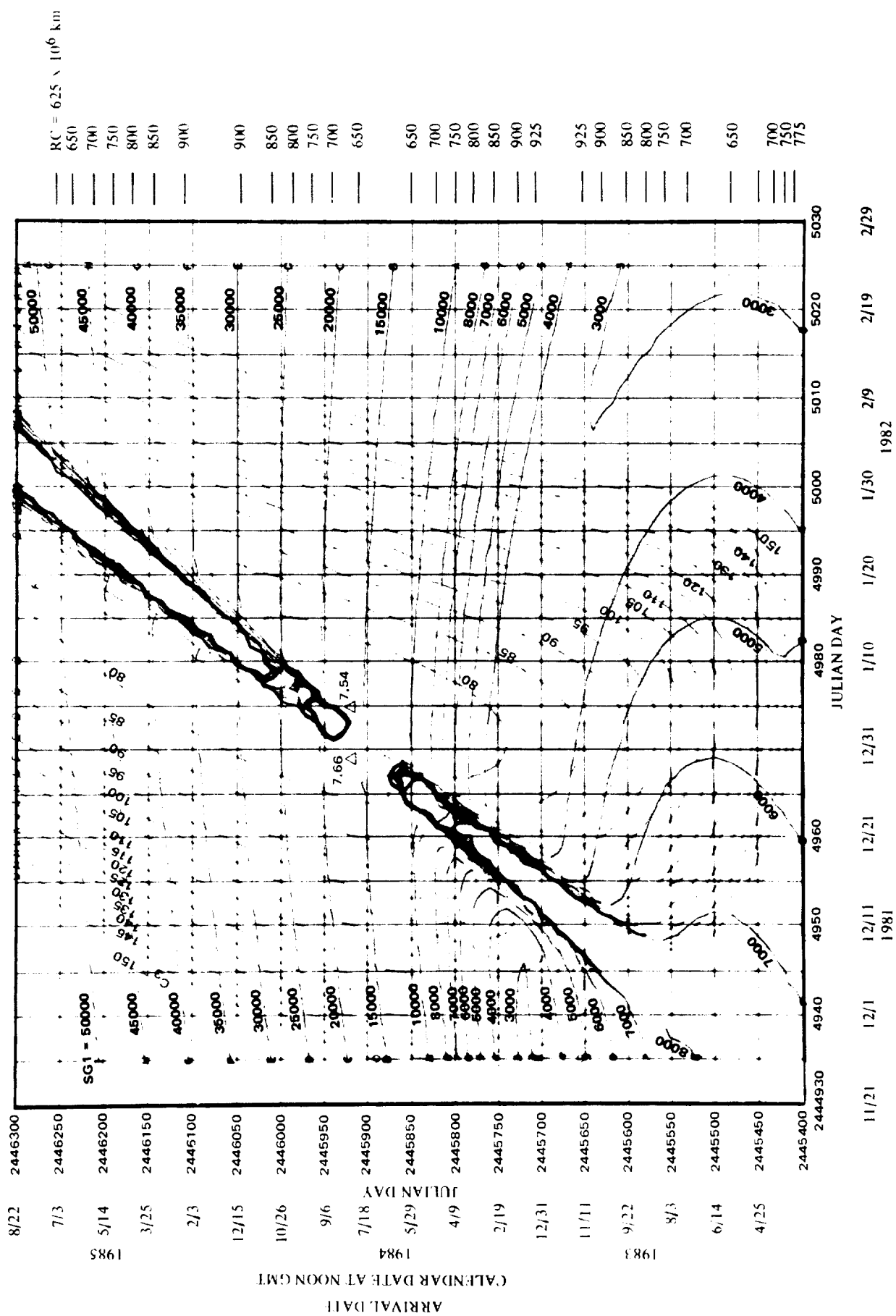




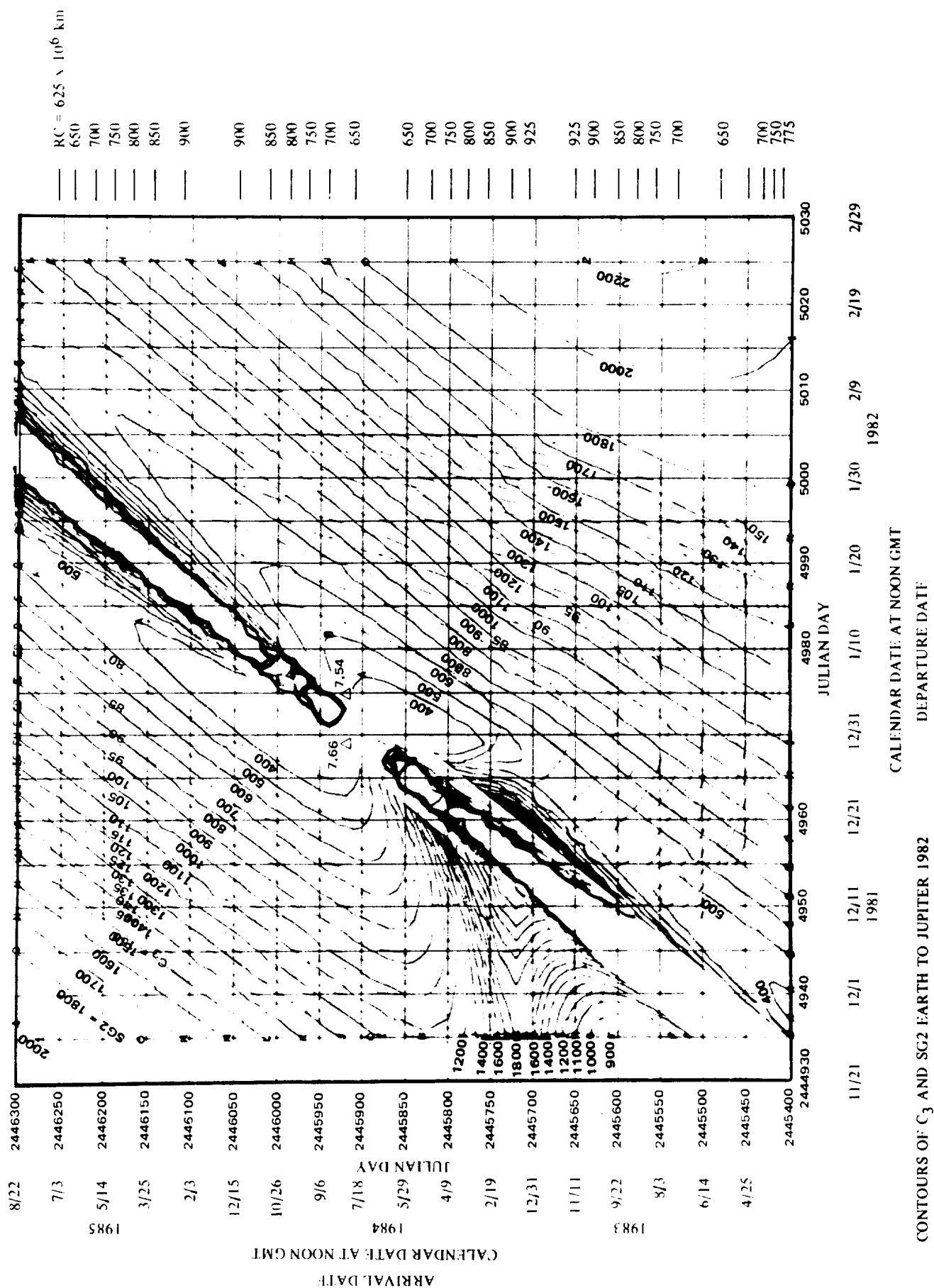


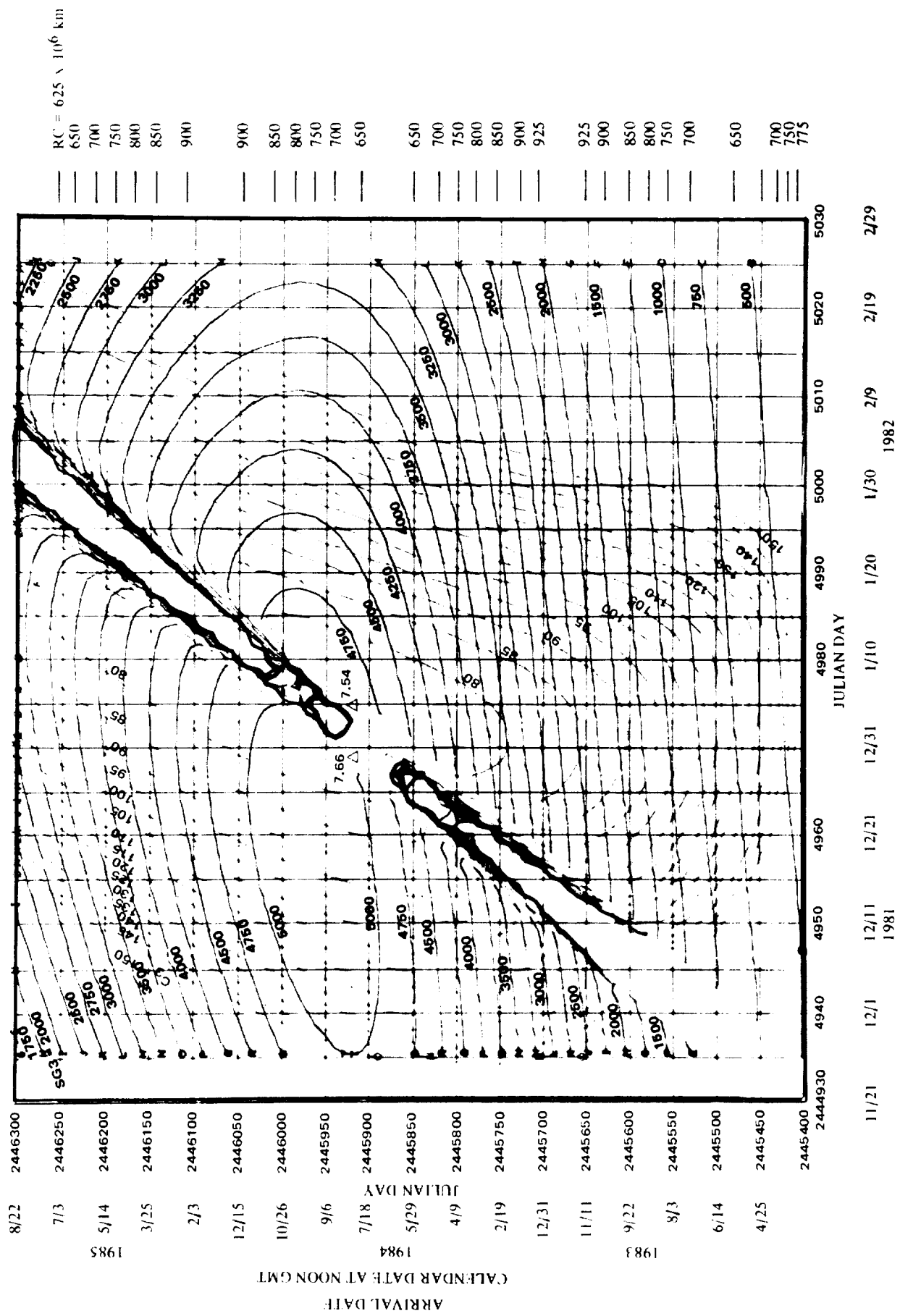






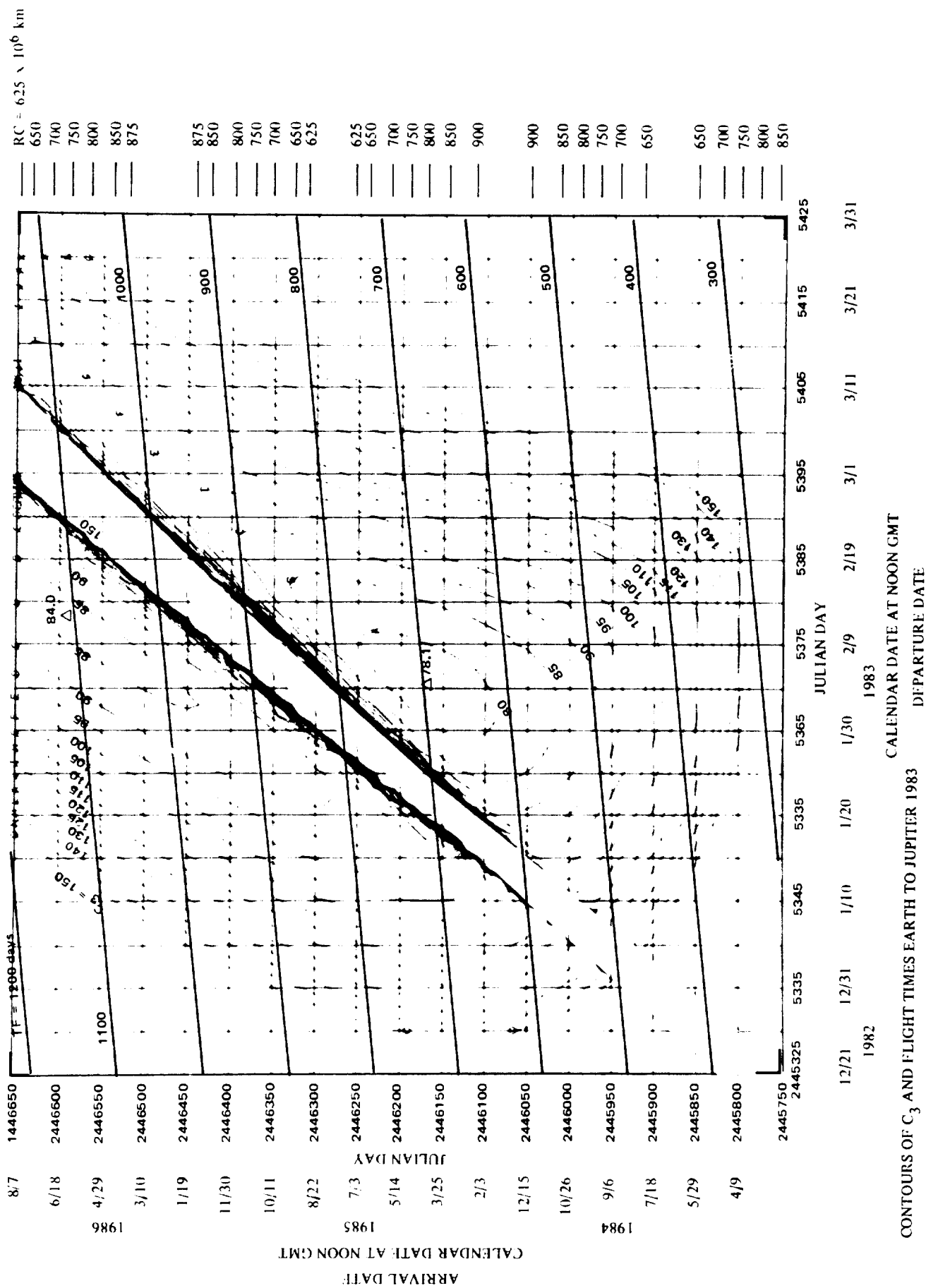
CONTOURS OF  $C_3$  AND SG1 EARTH TO JUPITER 1982

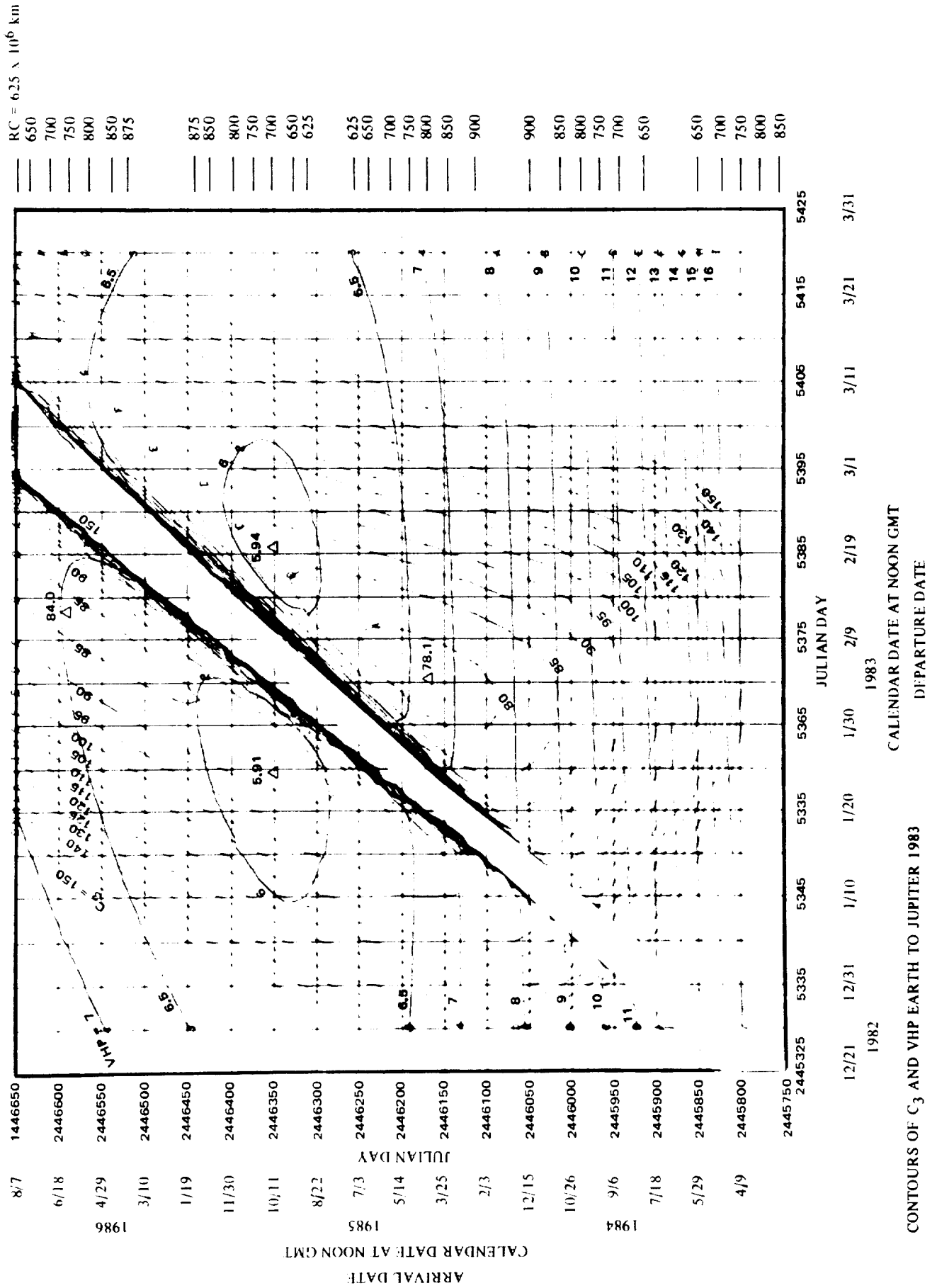


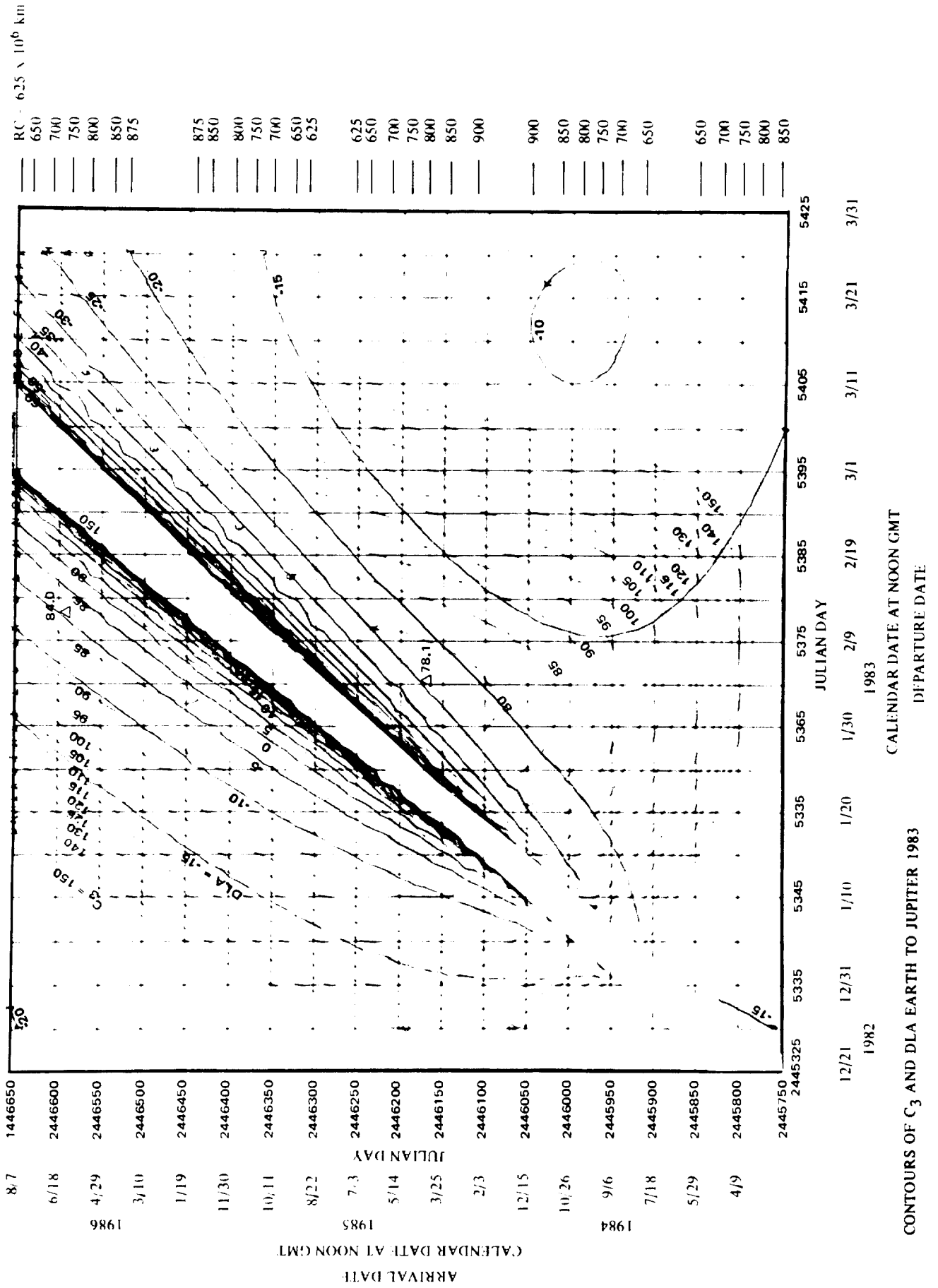


CONTOURS OF C<sub>3</sub> AND SG3 EARTH TO JUPITER 1982

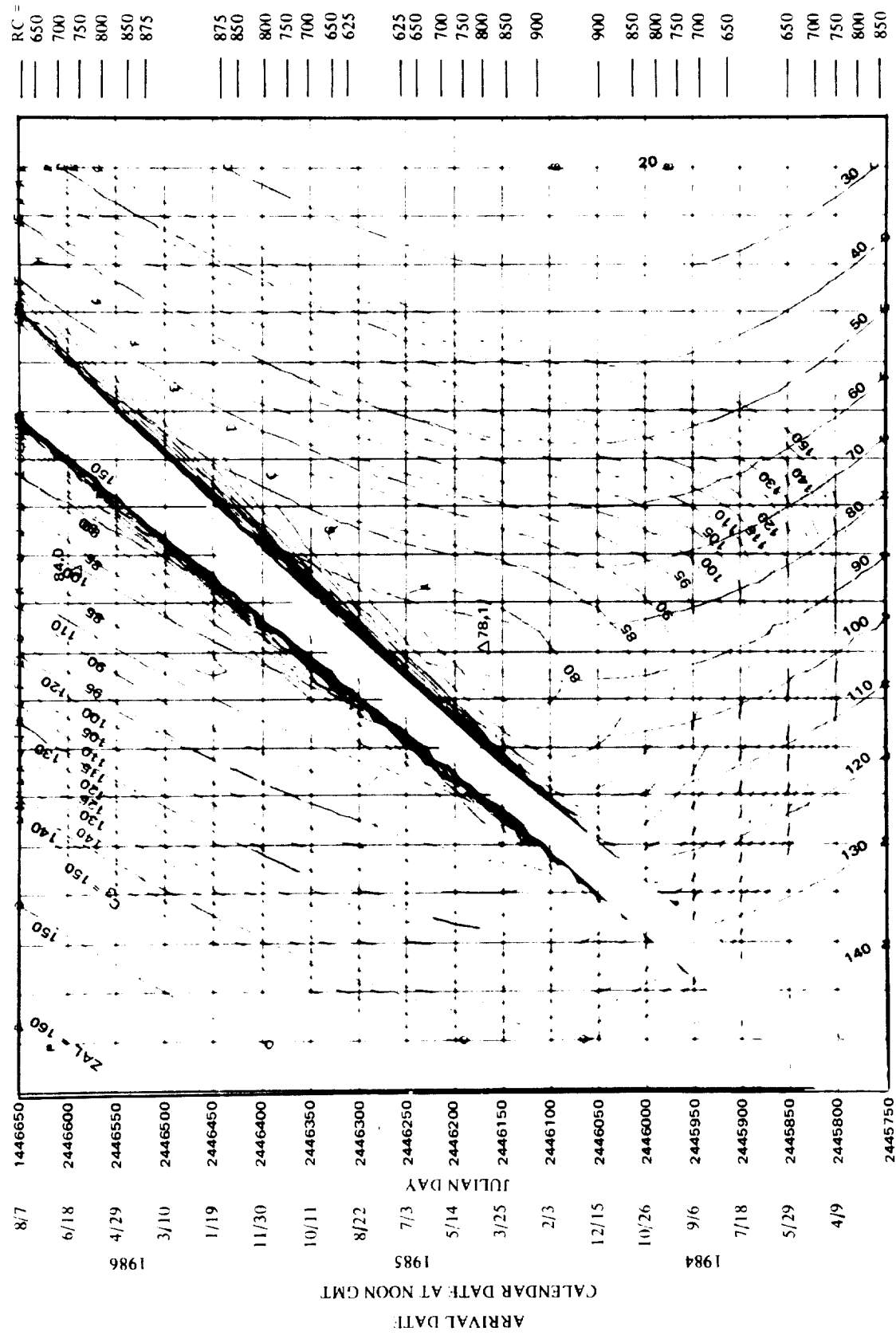


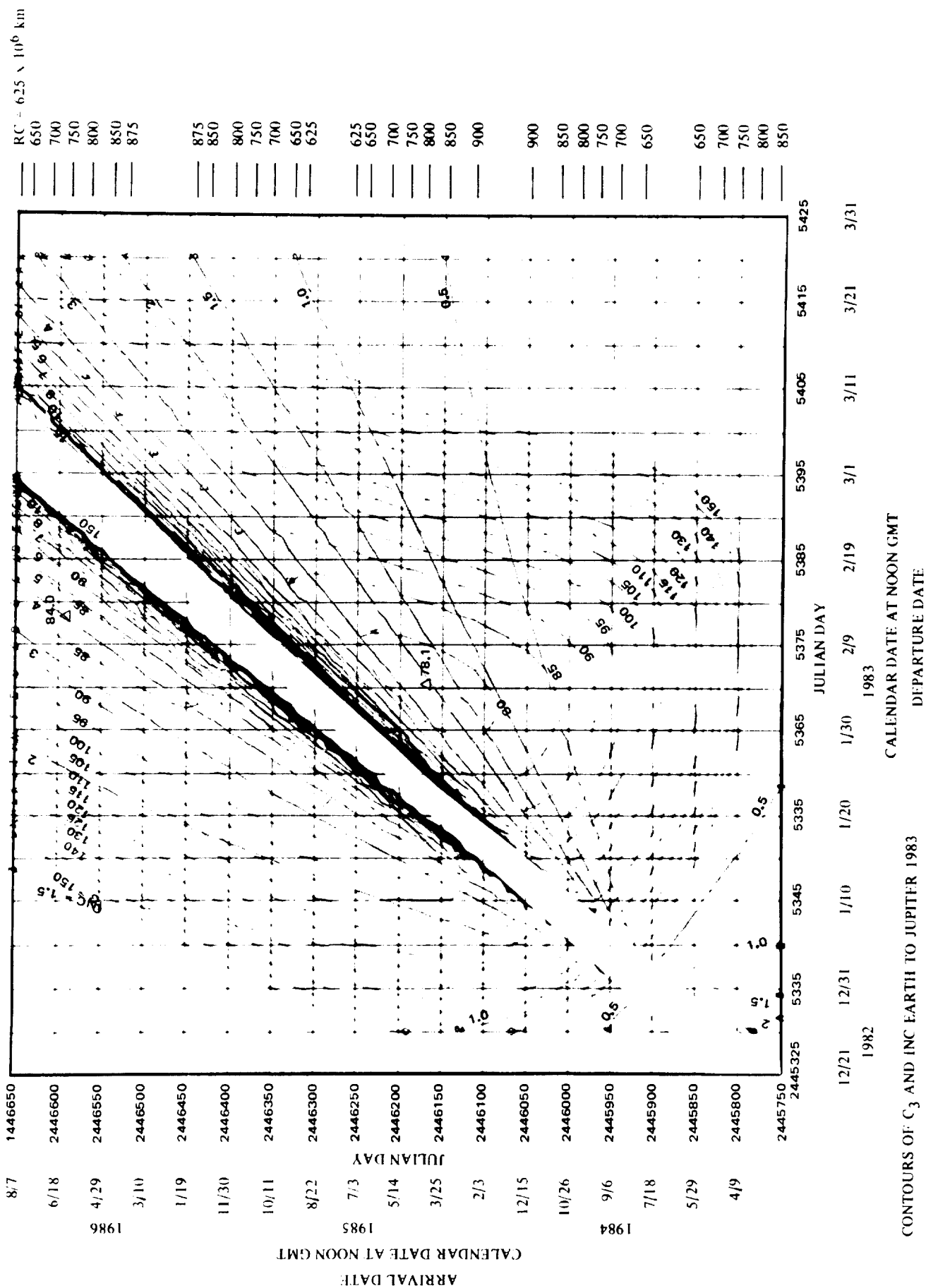




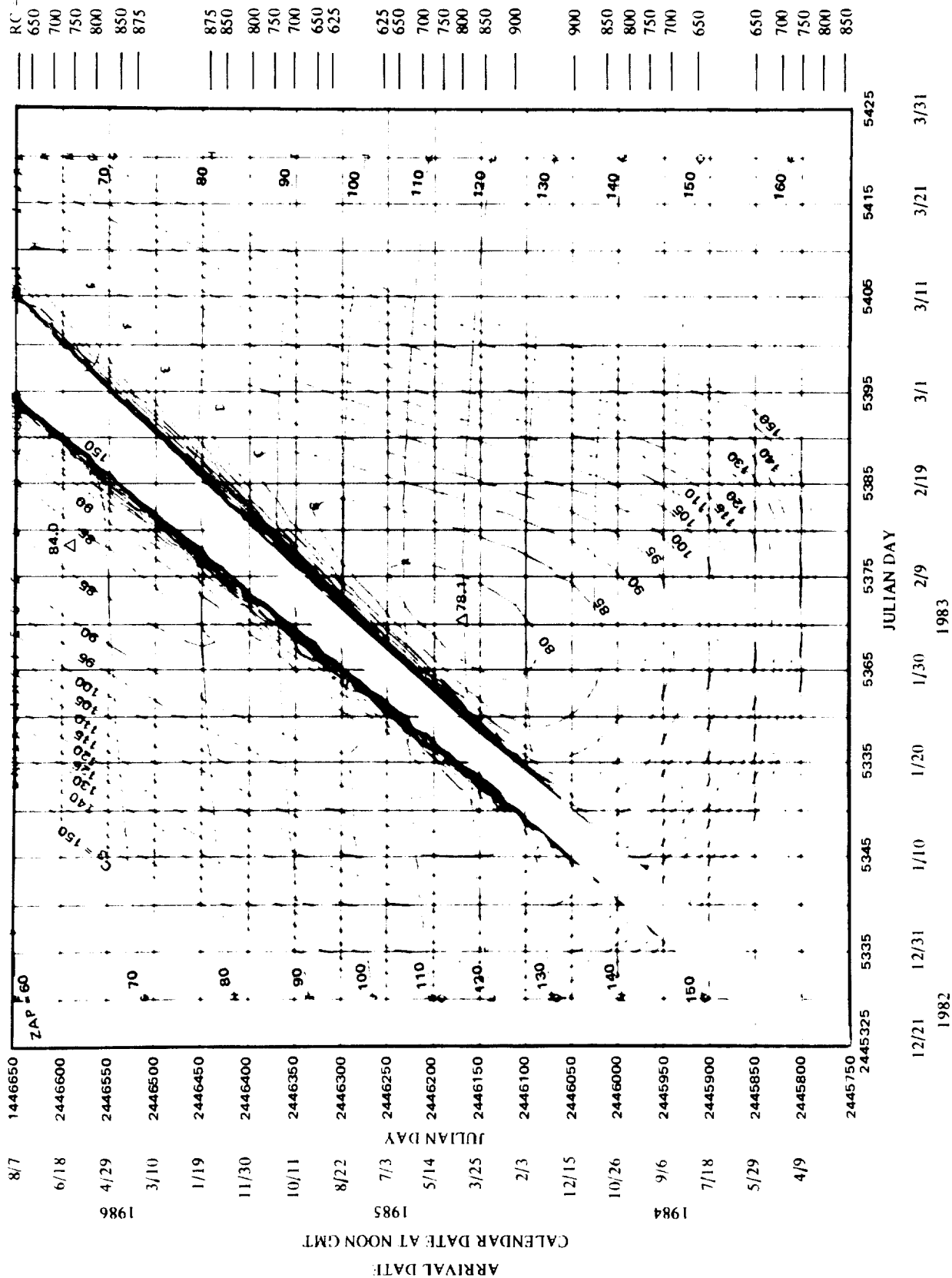


RC = 6.25 x 10<sup>6</sup> km



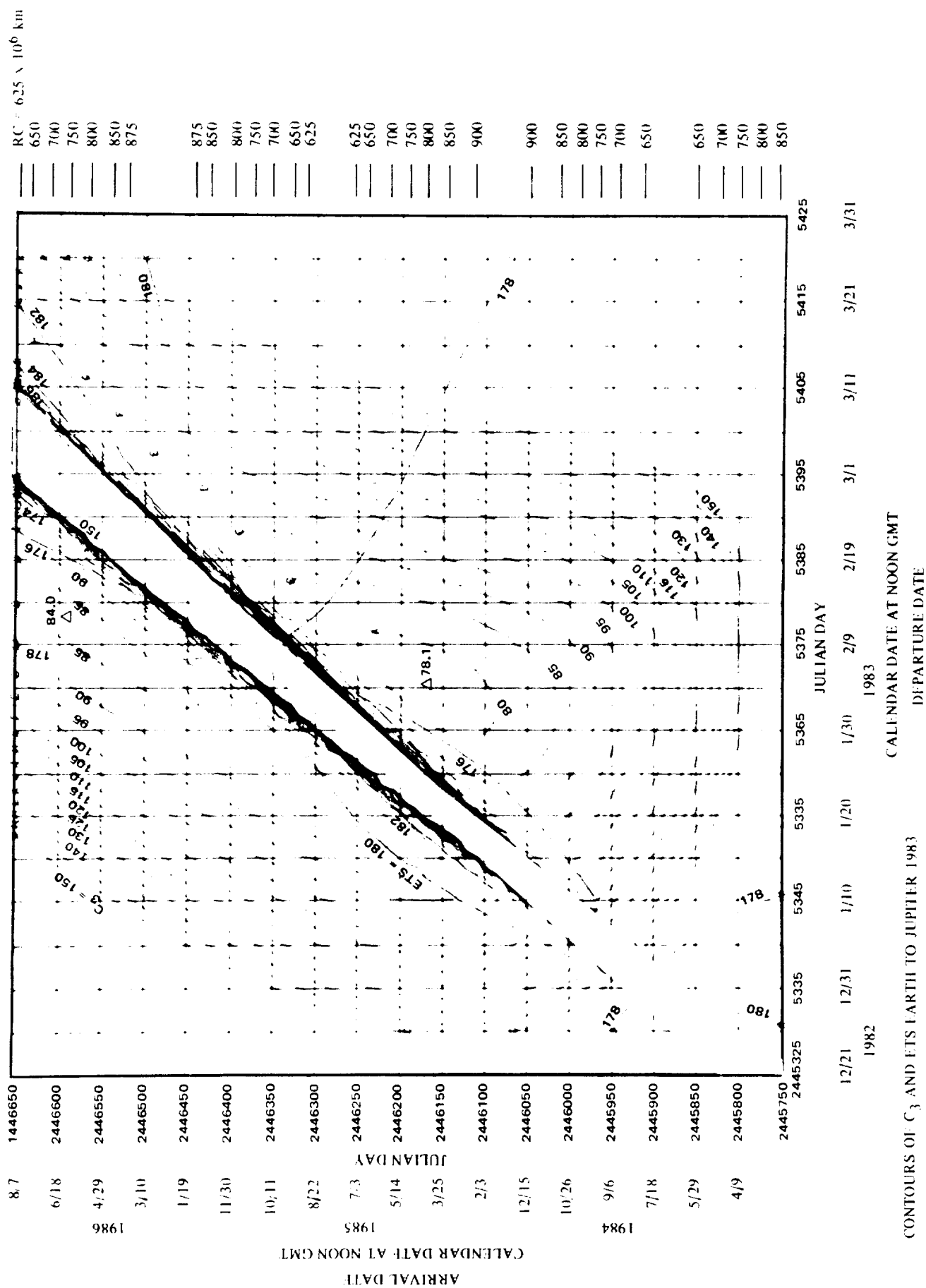


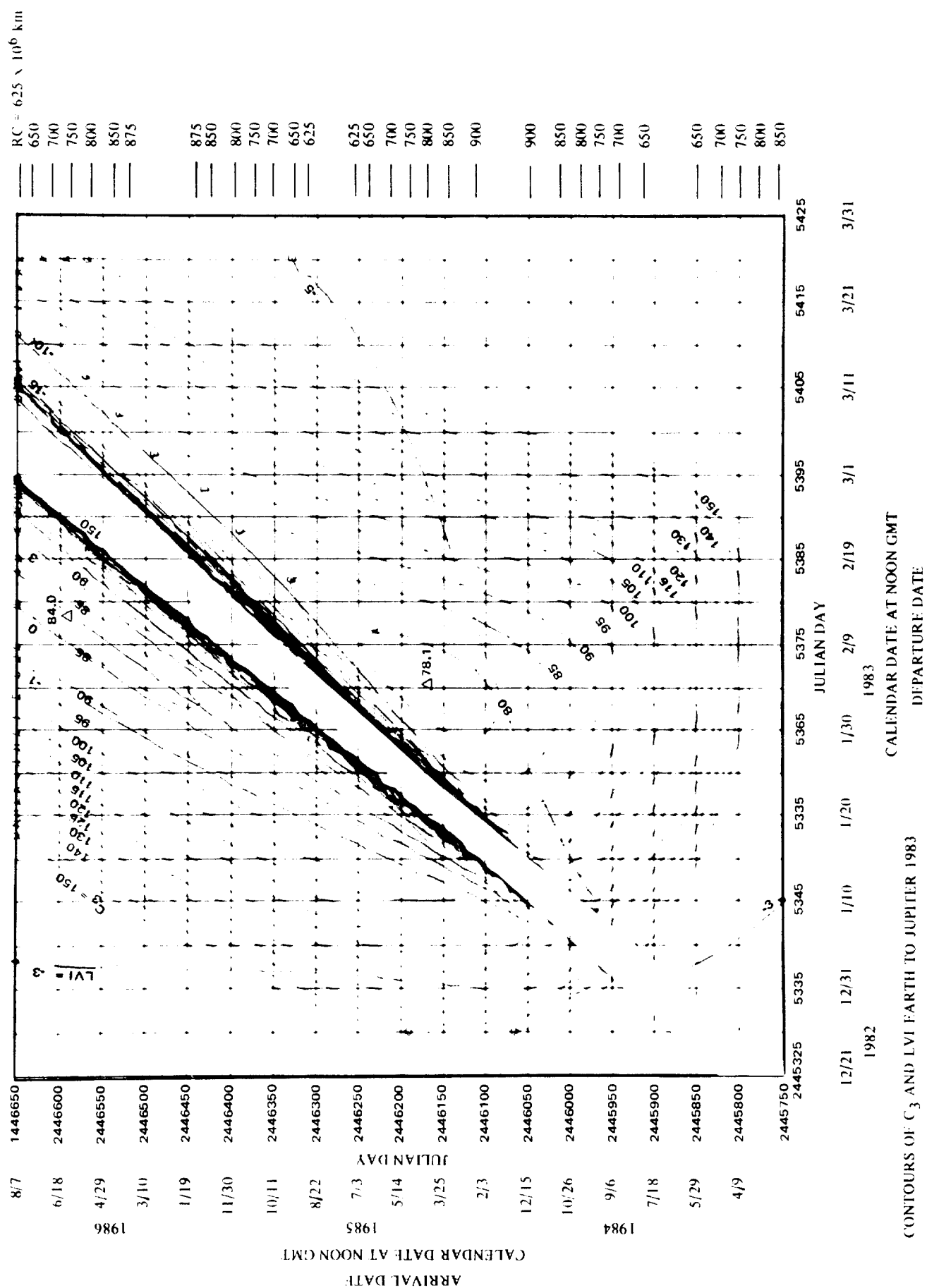
RC - 625 x 10<sup>6</sup> km



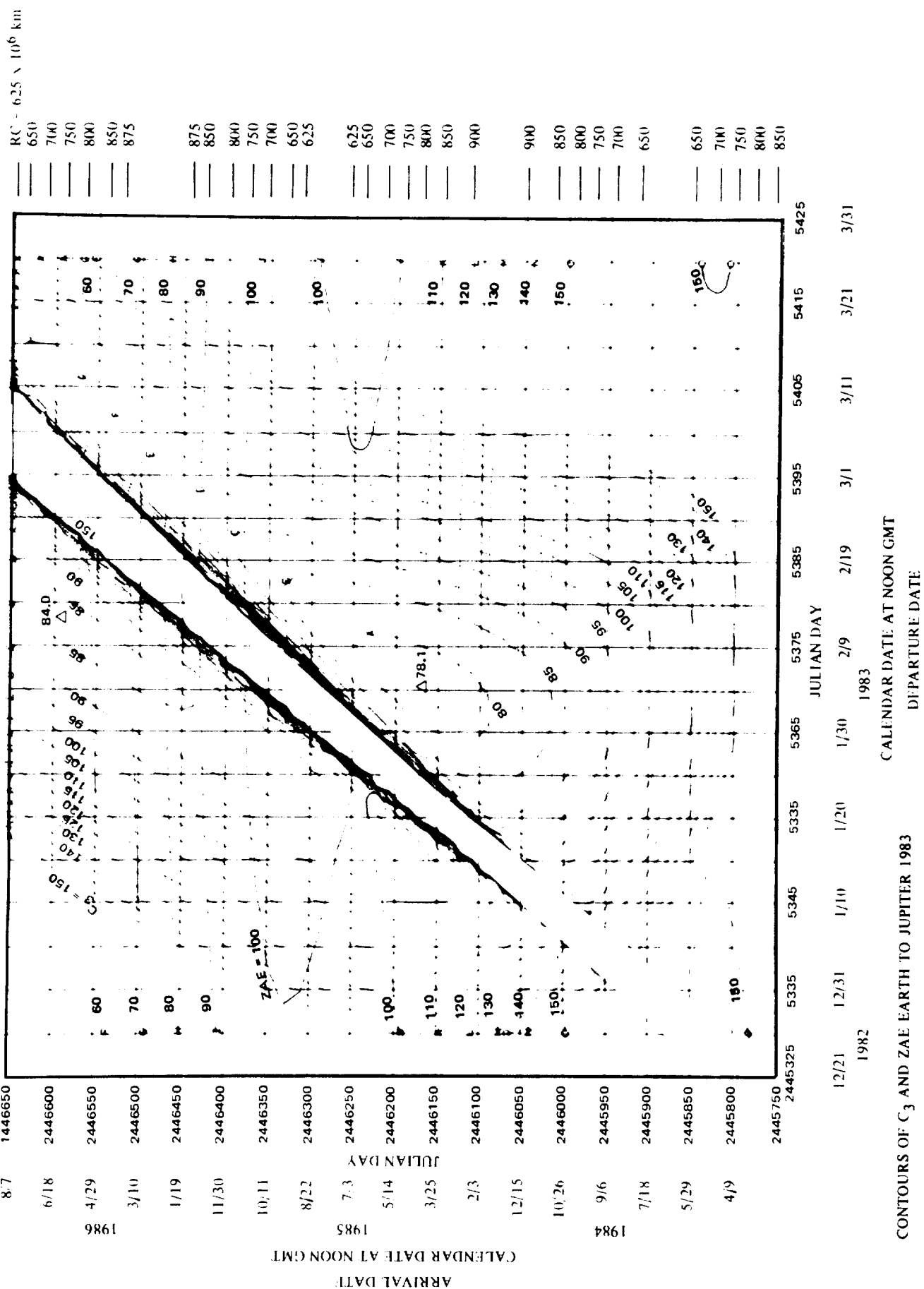
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

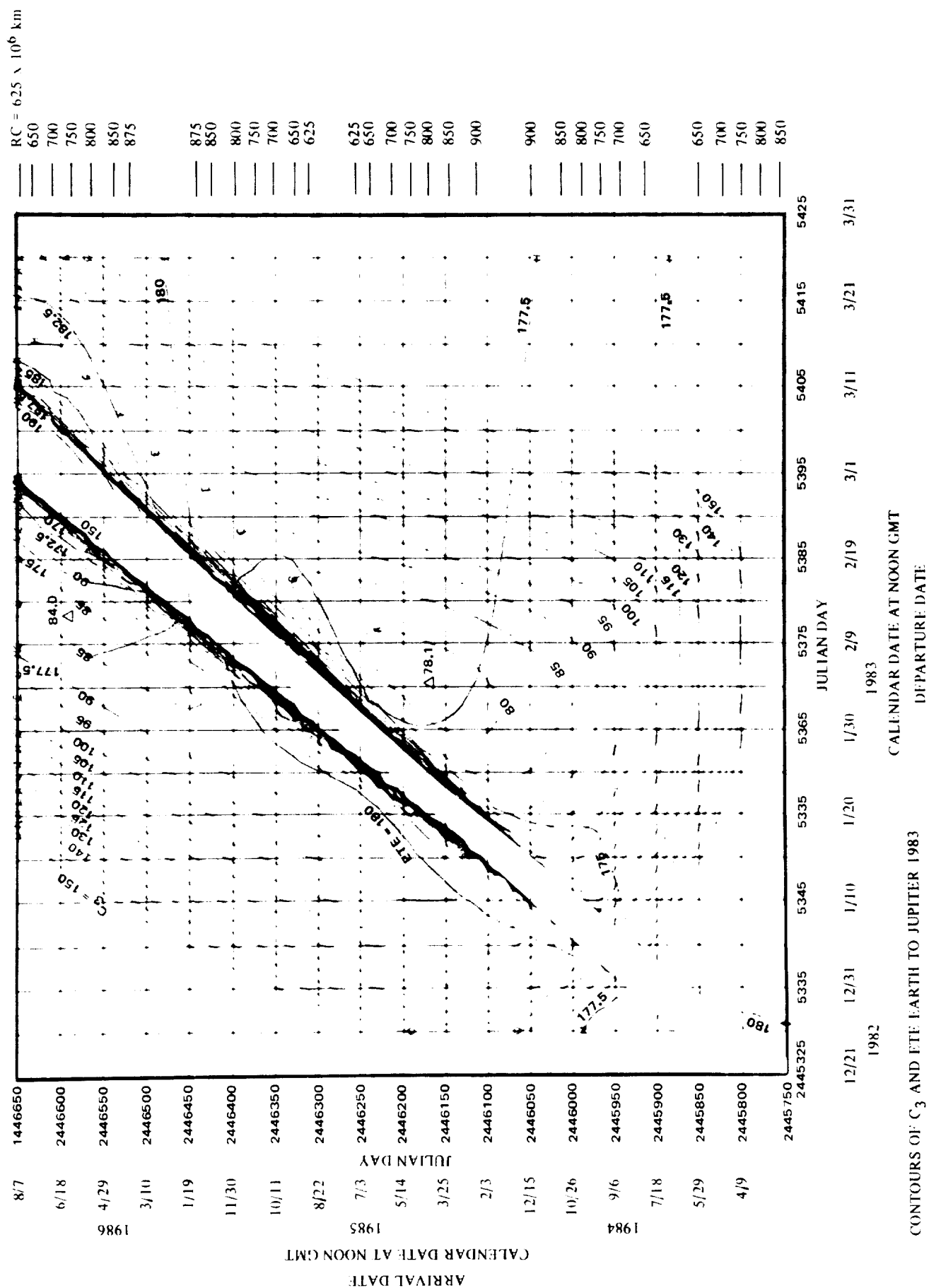
CONTOURS OF C<sub>3</sub> AND ZAP EARTH TO JUPITER 1983



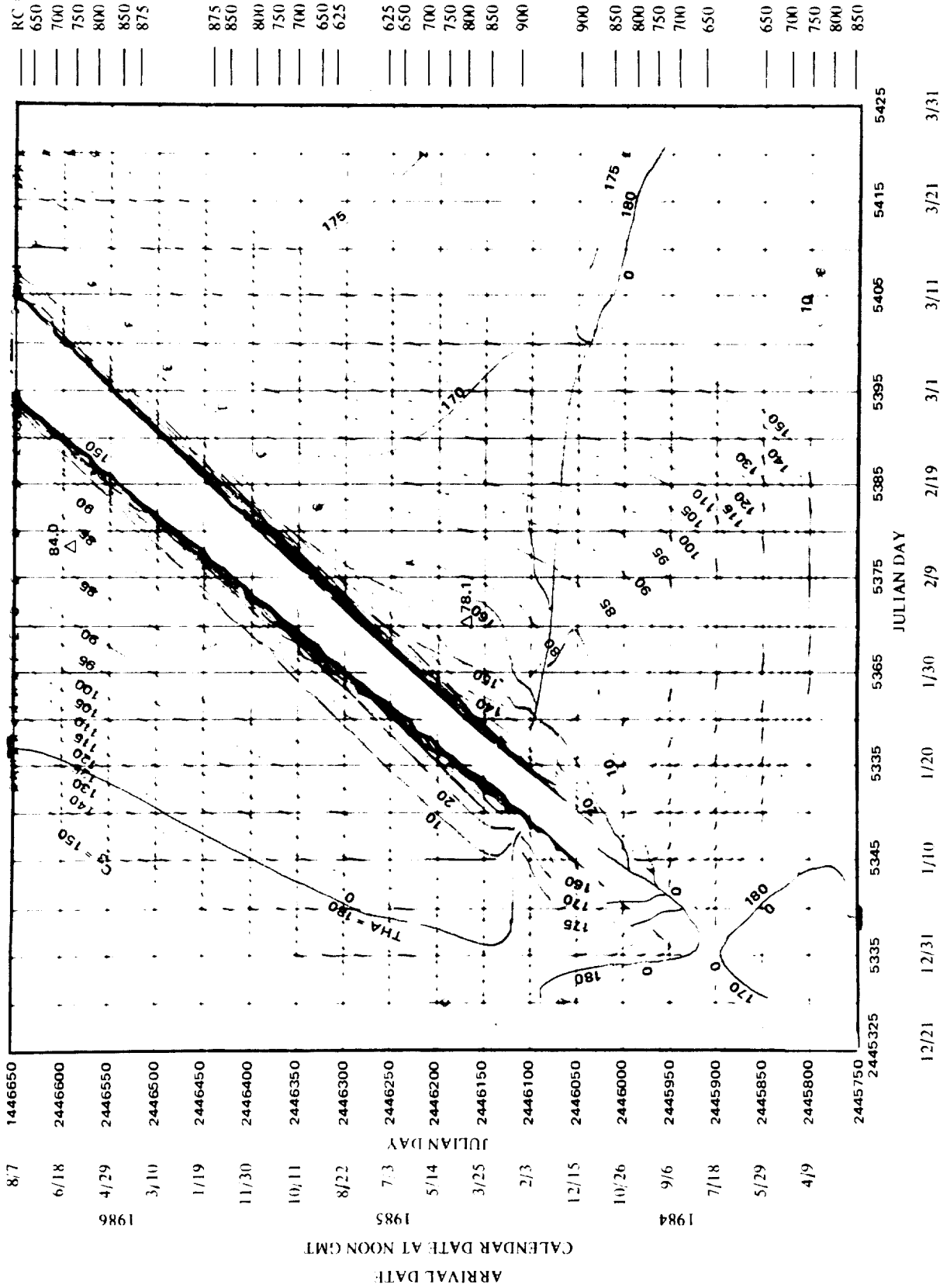






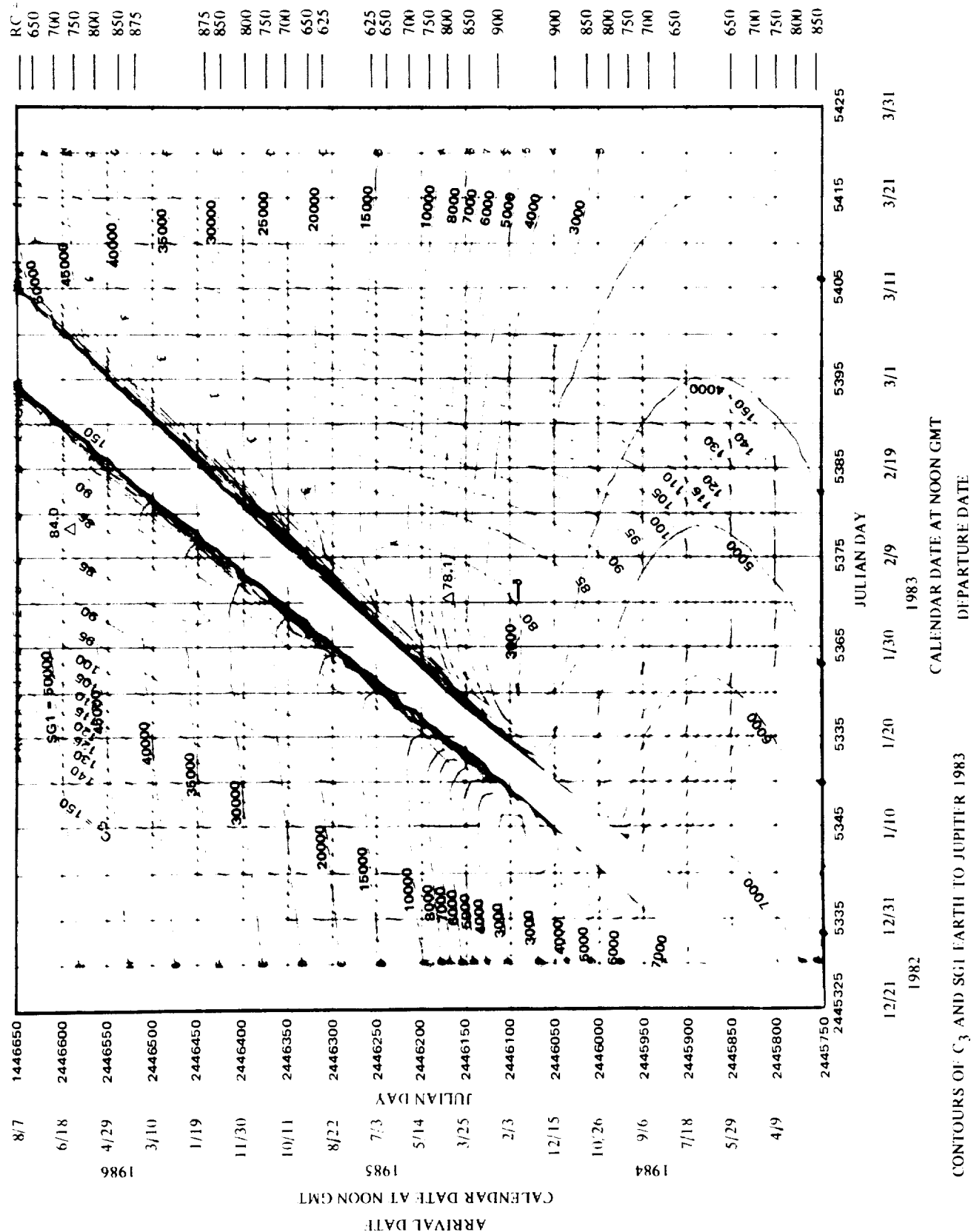


RC = 625 x 10<sup>6</sup> km



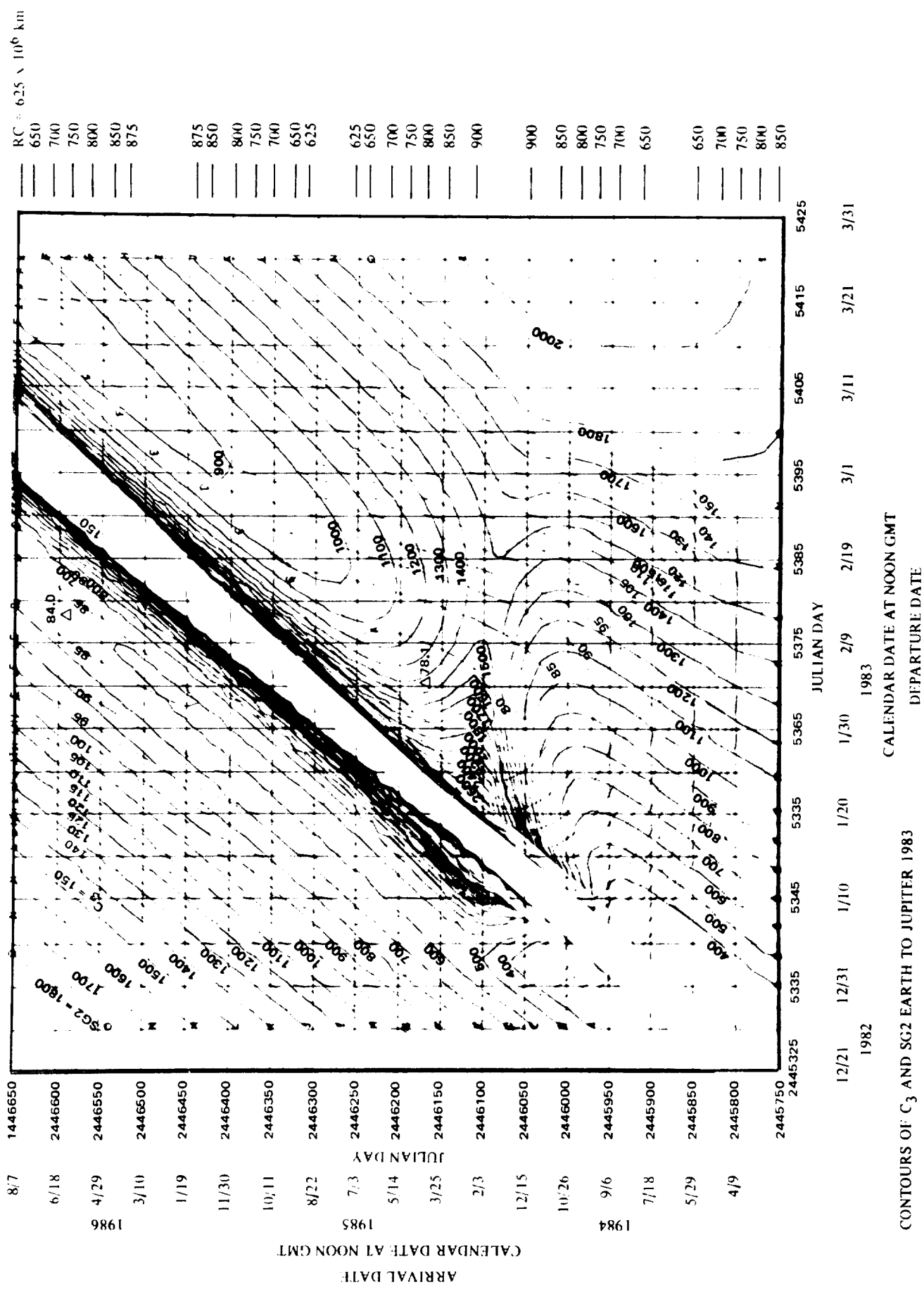
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND THA FATH TO JUPITER 1983

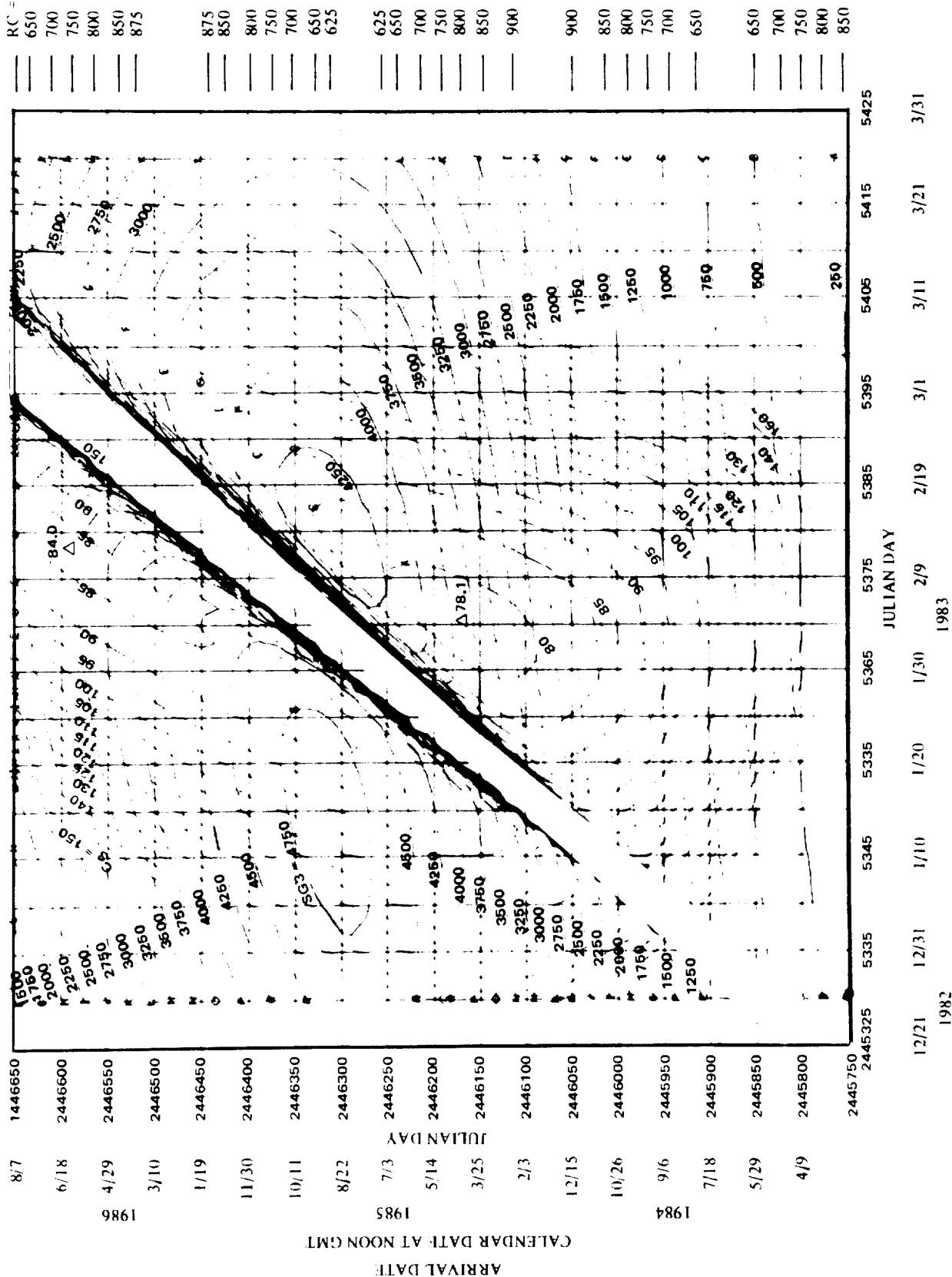
$$RC = 625 \times 10^6 \text{ km}$$
CONTOURS OF  $C_3$  AND SC1 EARTH TO JUPITER 1983

CALENDAR DATE AT NOON GMT

DEPARTURE DATE

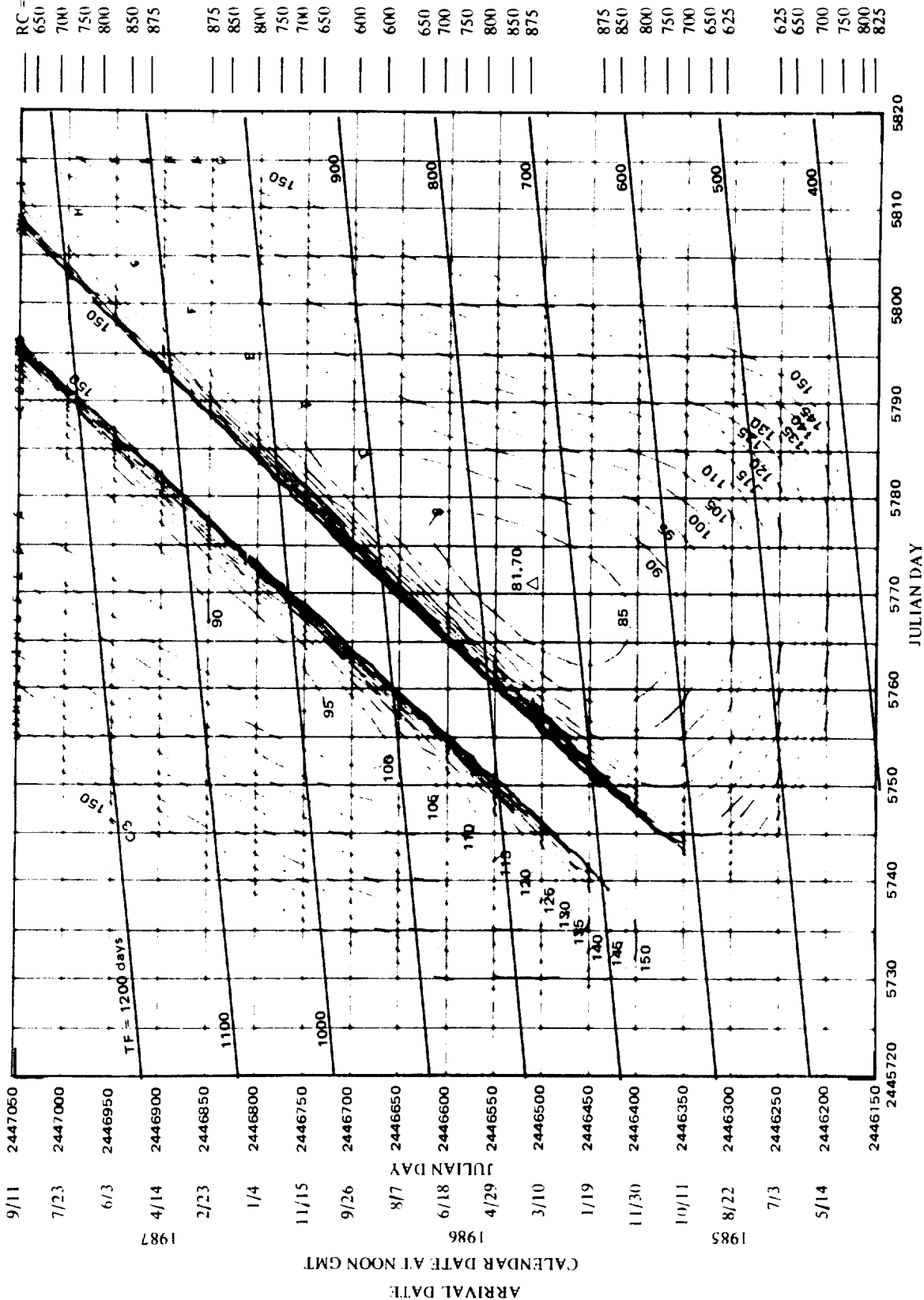


RC =  $625 \times 10^6$  km

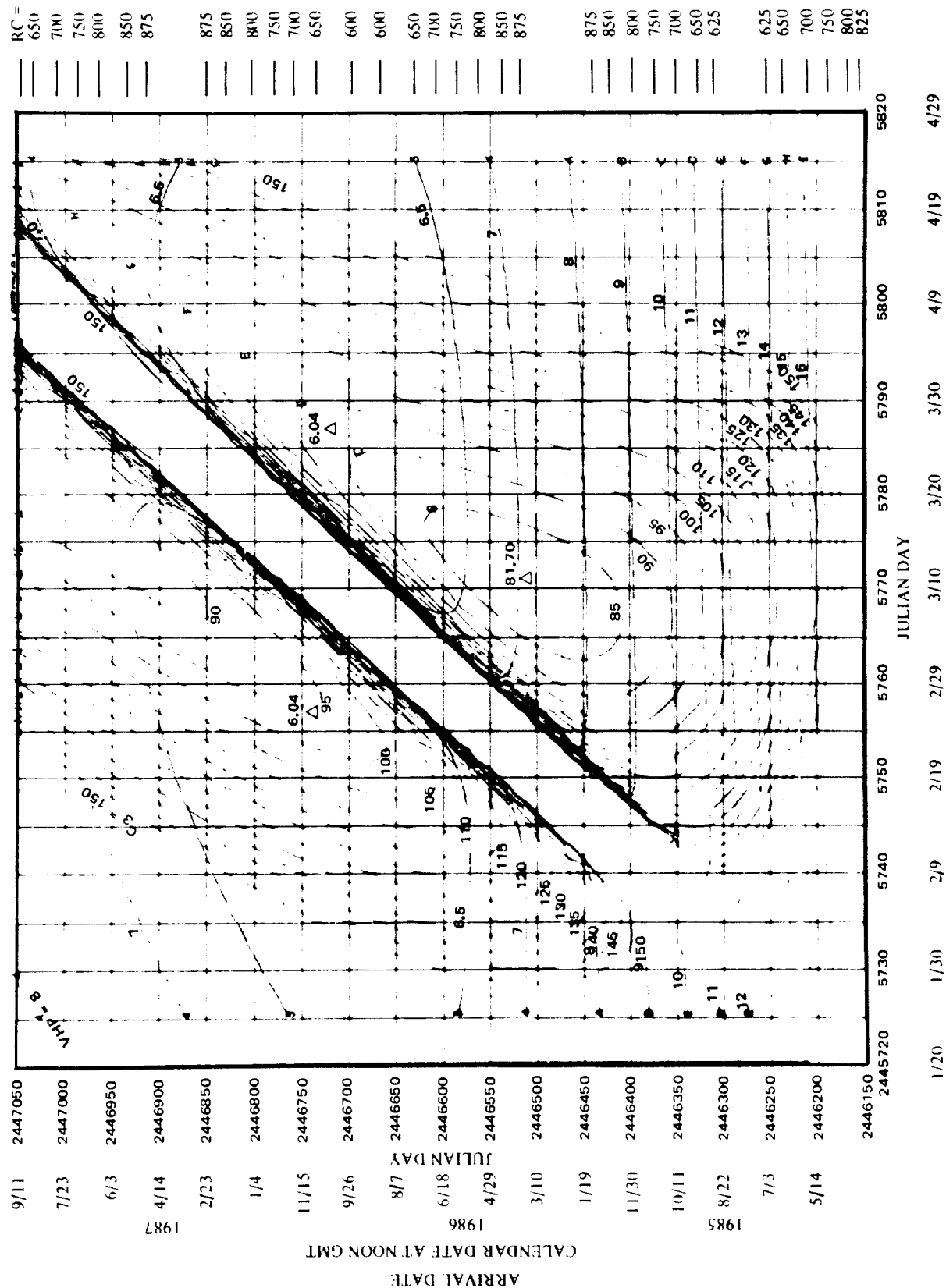


CONTOURS OF C<sub>3</sub> AND SG3 EARTH TO JUPITER 1983  
 ARRIVAL DATE AT NOON GMT  
 DEPARTURE DATE  
 1982  
 1983  
 1984  
 1985  
 1986

RC =  $625 \times 10^6$  km



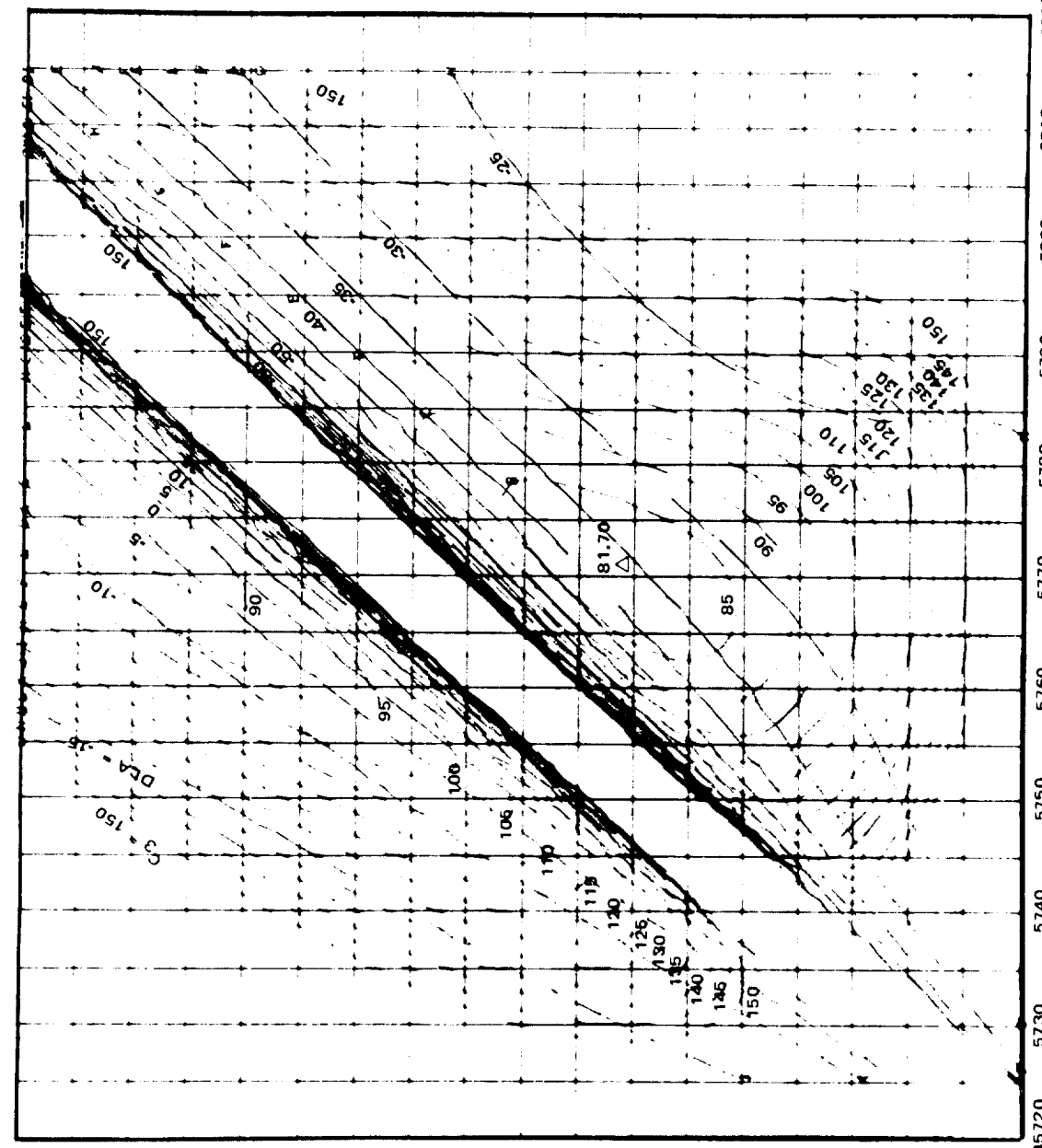
RC =  $625 \times 10^6$  km





RC = 625 x 10<sup>6</sup> km

650  
700  
750  
800  
850  
875  
  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
850  
875  
  
875  
850  
800  
750  
700  
650  
625  
  
625  
650  
700  
750  
800  
825



9/11 2447050  
7/23 2447000  
6/3 2446950  
4/14 2446900  
2/23 2446850  
1/4 2446800  
11/15 2446750  
9/26 2446700  
8/7 2446650  
6/18 2446600  
4/29 2446550  
3/10 2446500  
1/19 2446450  
11/30 2446400  
10/11 2446350  
8/22 2446300  
7/3 2446250  
5/14 2446200  
2446150

1987  
1986  
1985

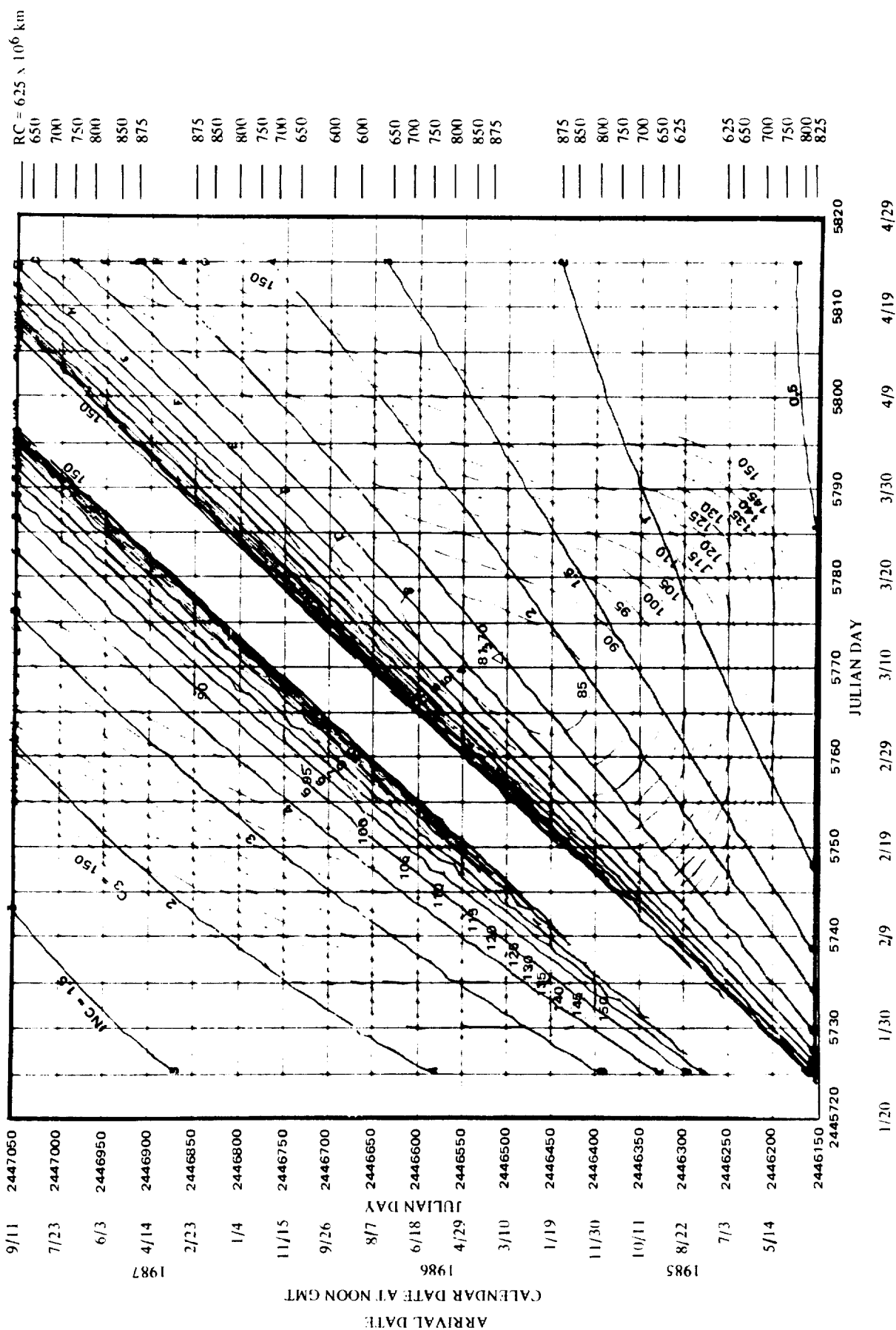
ARRIVAL DATE  
CALENDAR DATE AT NOON GMT  
JULIAN DAY  
DEPARTURE DATE  
CALENDAR DATE AT NOON GMT  
1984

CONTOURS OF C<sub>3</sub> AND DLA EARTH JUPITER 1984

650

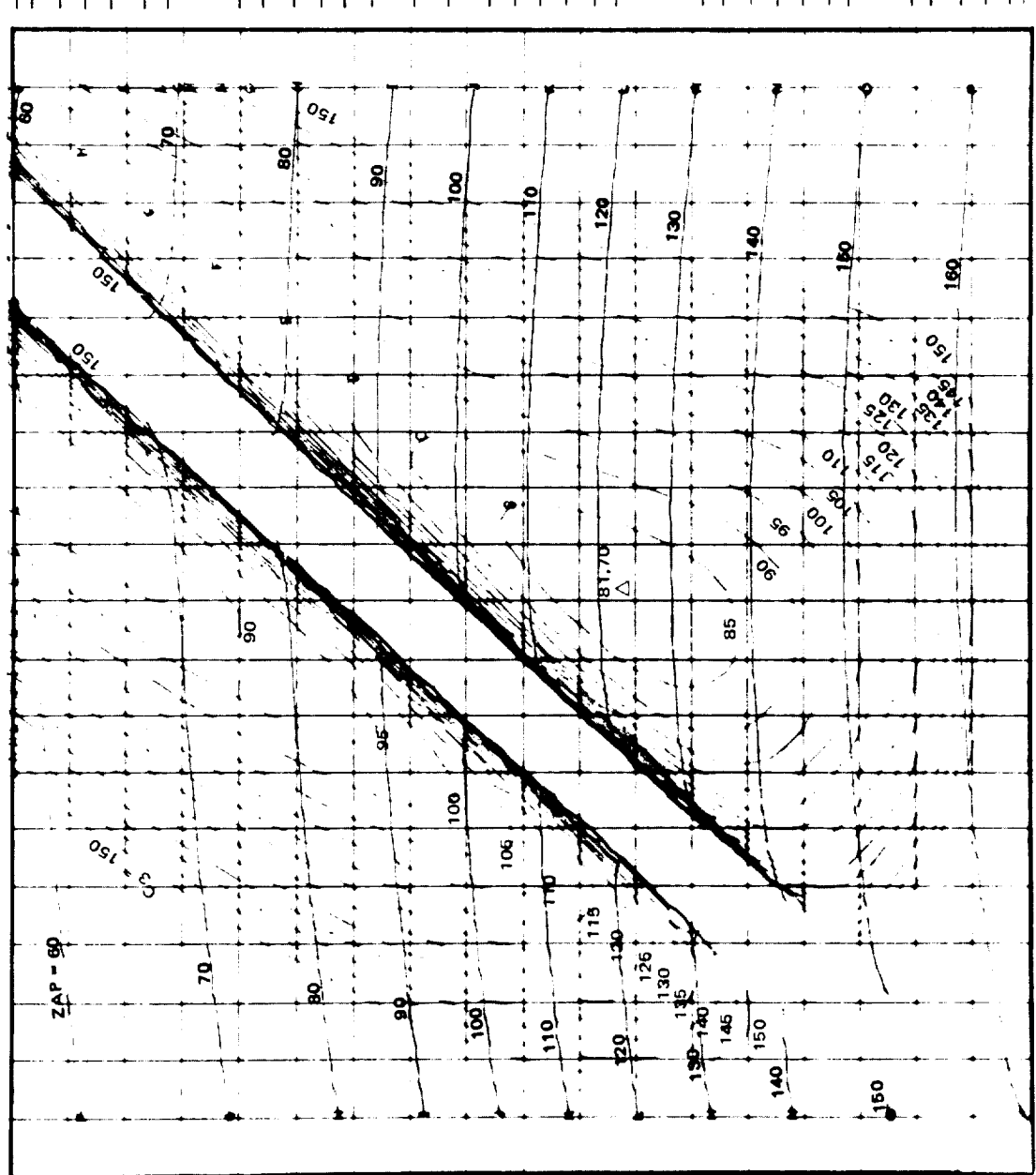


DEPARTURE DATE:



RC = 625 x 10<sup>6</sup> km

650 700 750 800 850 875  
875 850 800 750 700 650  
600 600 650 700 750 800 850 875  
875 850 800 750 700 650 625  
625 650 700 750 800 825



JULIAN DAY

1/20 1/30 2/9 2/19 2/29 3/10 3/20 3/30 4/9 4/19 4/29

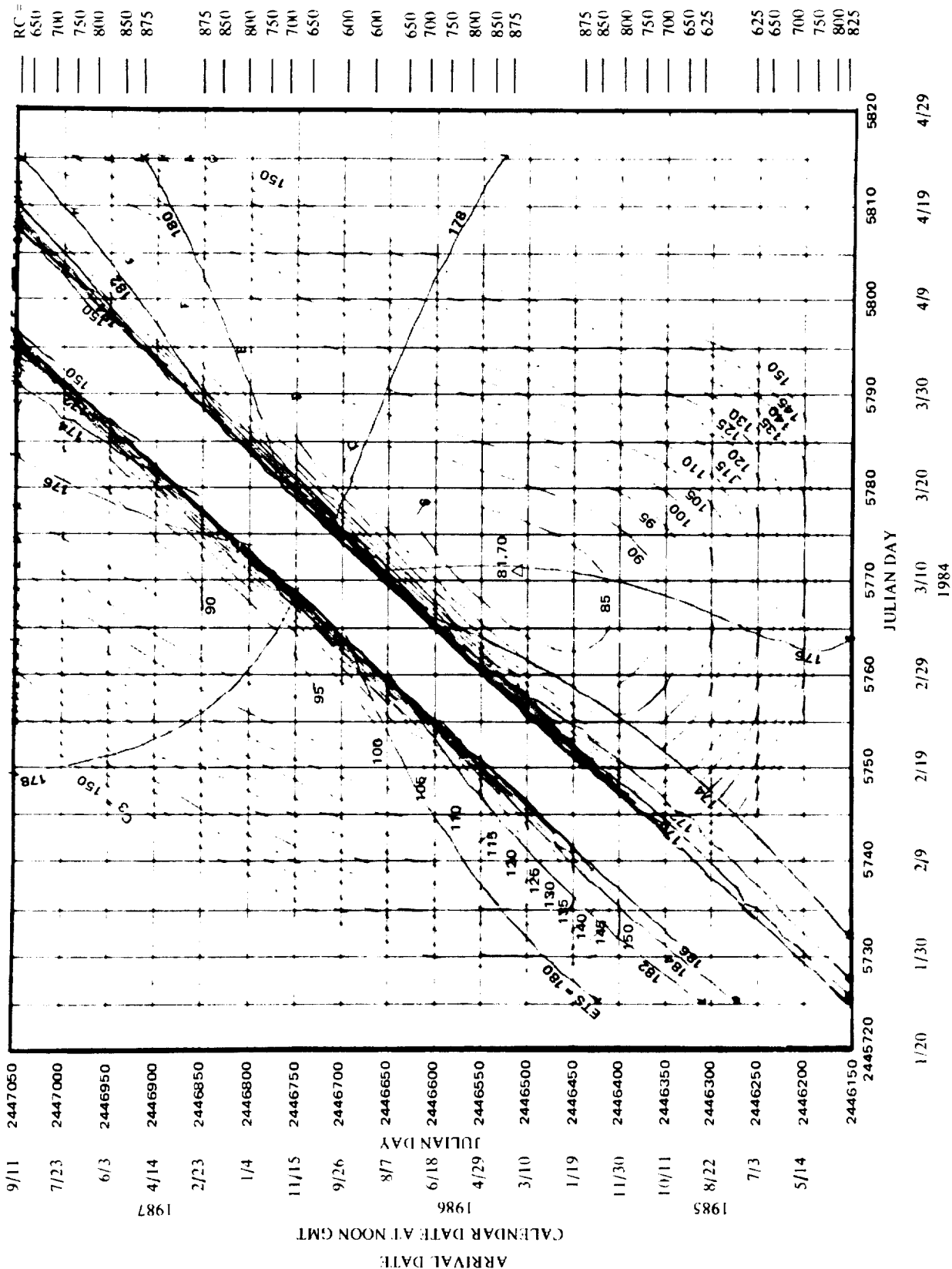
CALENDAR DATE AT NOON GMT

1984

CONTOURS OF C<sub>3</sub> AND ZAP EARTH JUPITER 1984

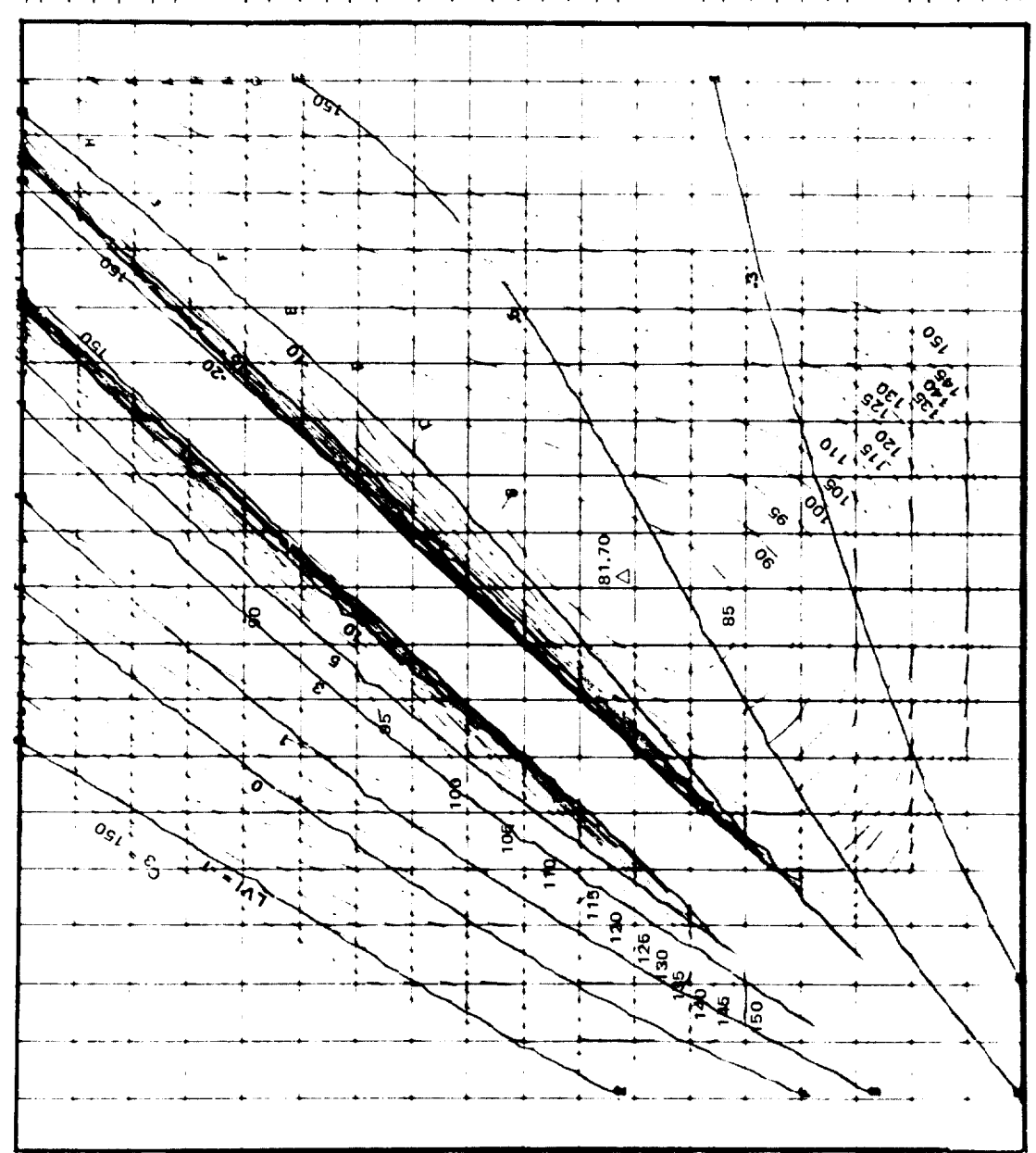
C-2

RC =  $625 \times 10^6$  km



RC =  $625 \times 10^6$  km

650  
700  
750  
800  
850  
875  
  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
850  
875  
  
875  
850  
800  
750  
700  
650  
625  
  
625  
650  
700  
750  
800  
825



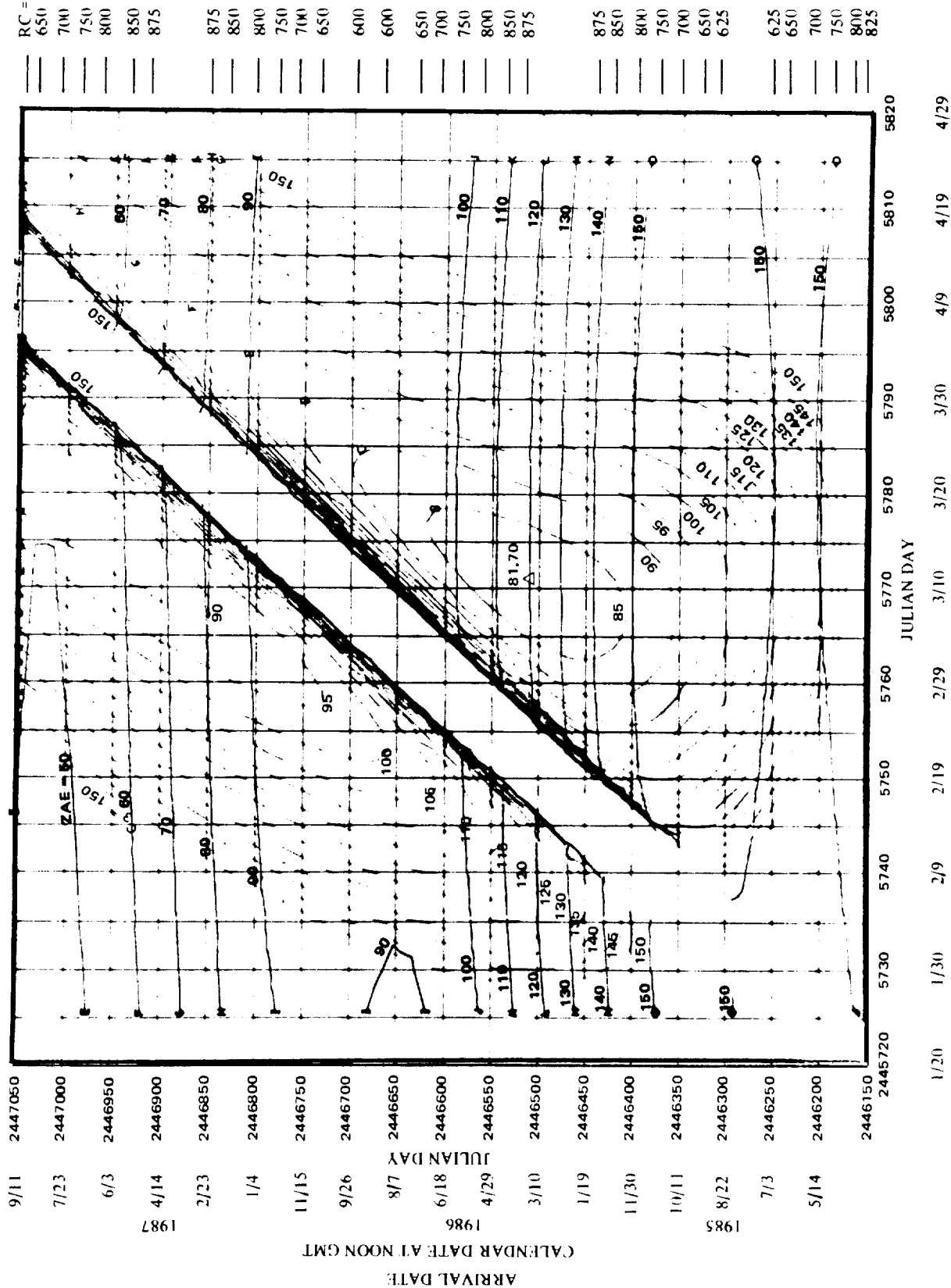
9/11 2447050  
7/23 2447000  
6/3 2446950  
4/14 2446900  
2/23 2446850  
1/4 2446800  
11/15 2446750  
9/26 2446700  
8/7 2446650  
6/18 2446600  
4/29 2446550  
3/10 2446500  
1/19 2446450  
11/30 2446400  
10/11 2446350  
8/22 2446300  
7/3 2446250  
5/14 2446200  
2446150

1987  
1986  
1985

CALENDAR DATE AT NOON GMT  
JULIAN DAY  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

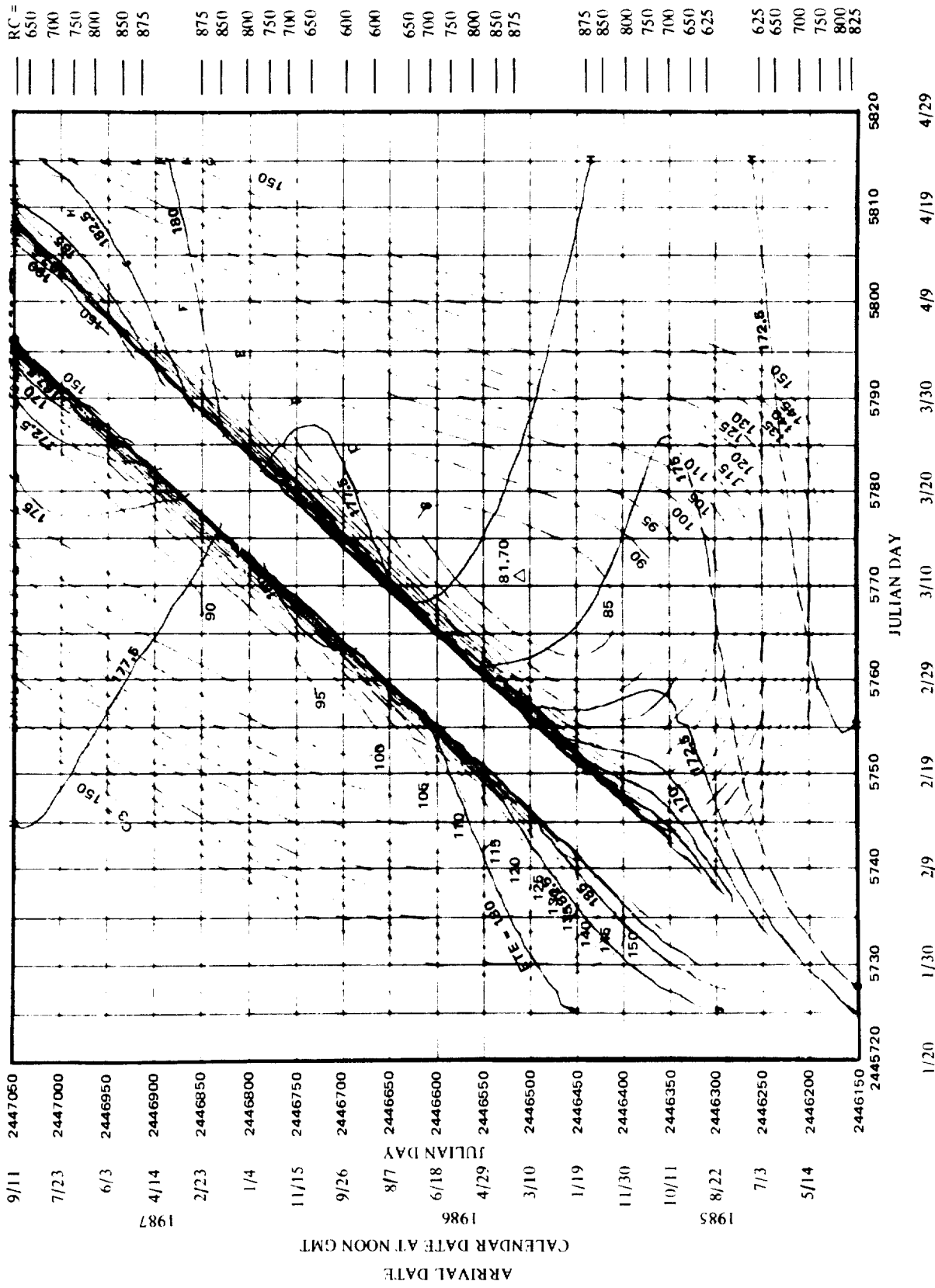
CONTOURS OF C<sub>3</sub> AND LVI EARTH JUPITER 1984

RC = 625 x 10<sup>6</sup> km



CONTOURS OF C<sub>3</sub> AND ZAE EARTH JUPITER 1984

RC =  $625 \times 10^6$  km



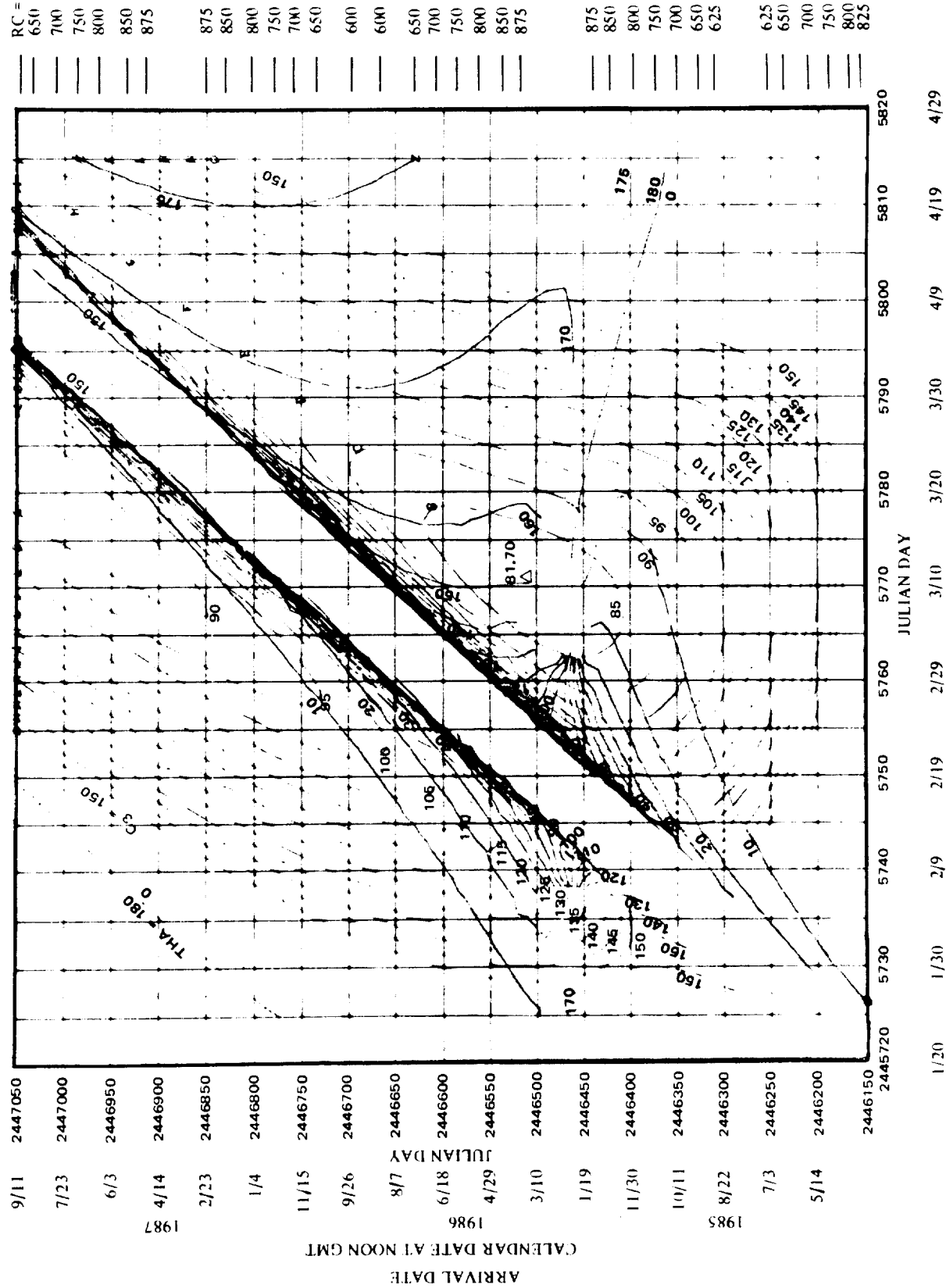
CALENDAR DATE AT NOON GMT

DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND ETE EARTH JUPITER 1984

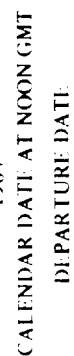


RC =  $625 \times 10^6$  km



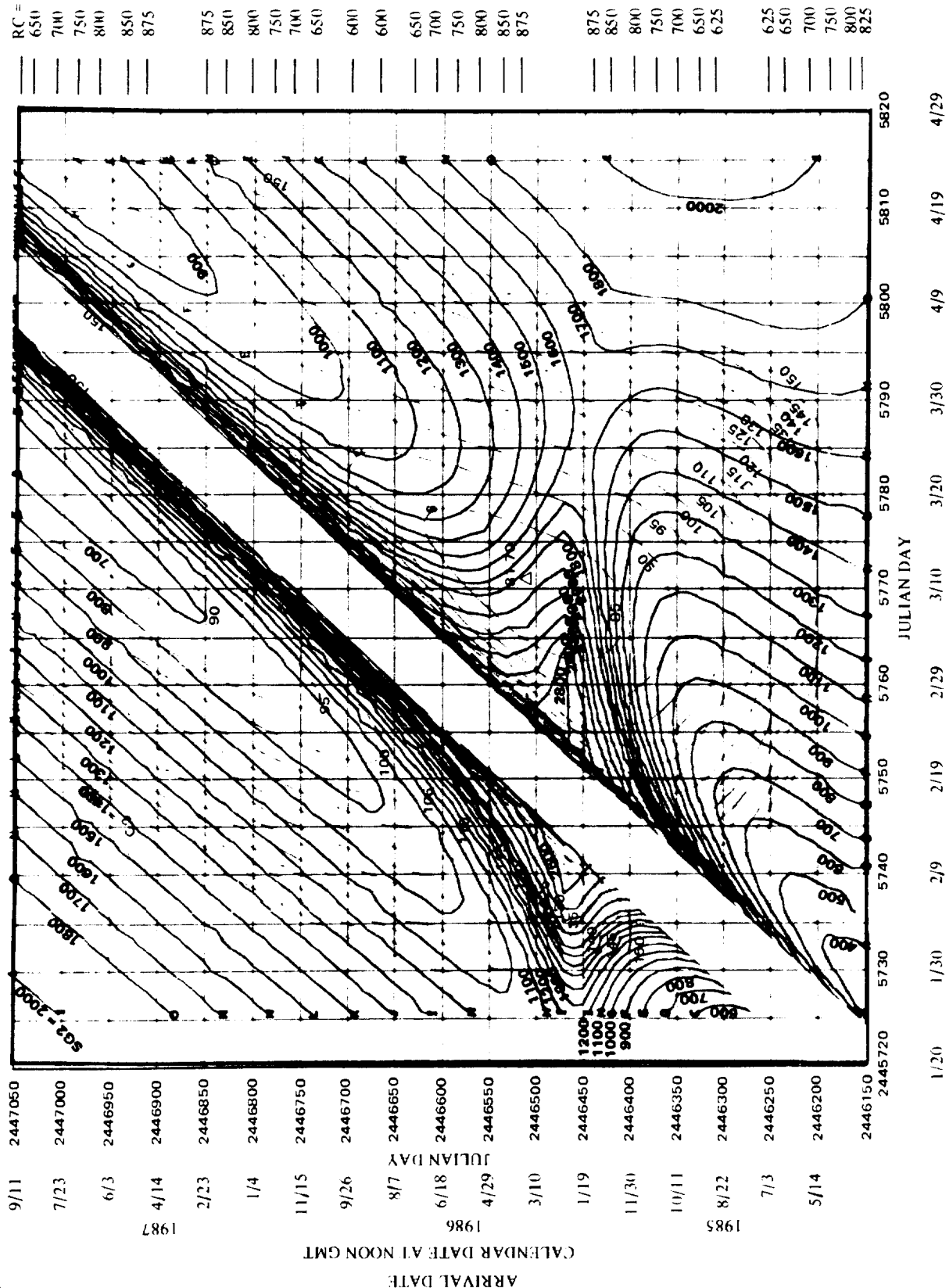
CONTOURS OF C<sub>3</sub> AND THA EARTH JUPITER 1984

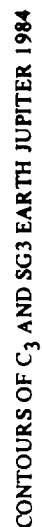
625  
650  
700  
750  
800  
825

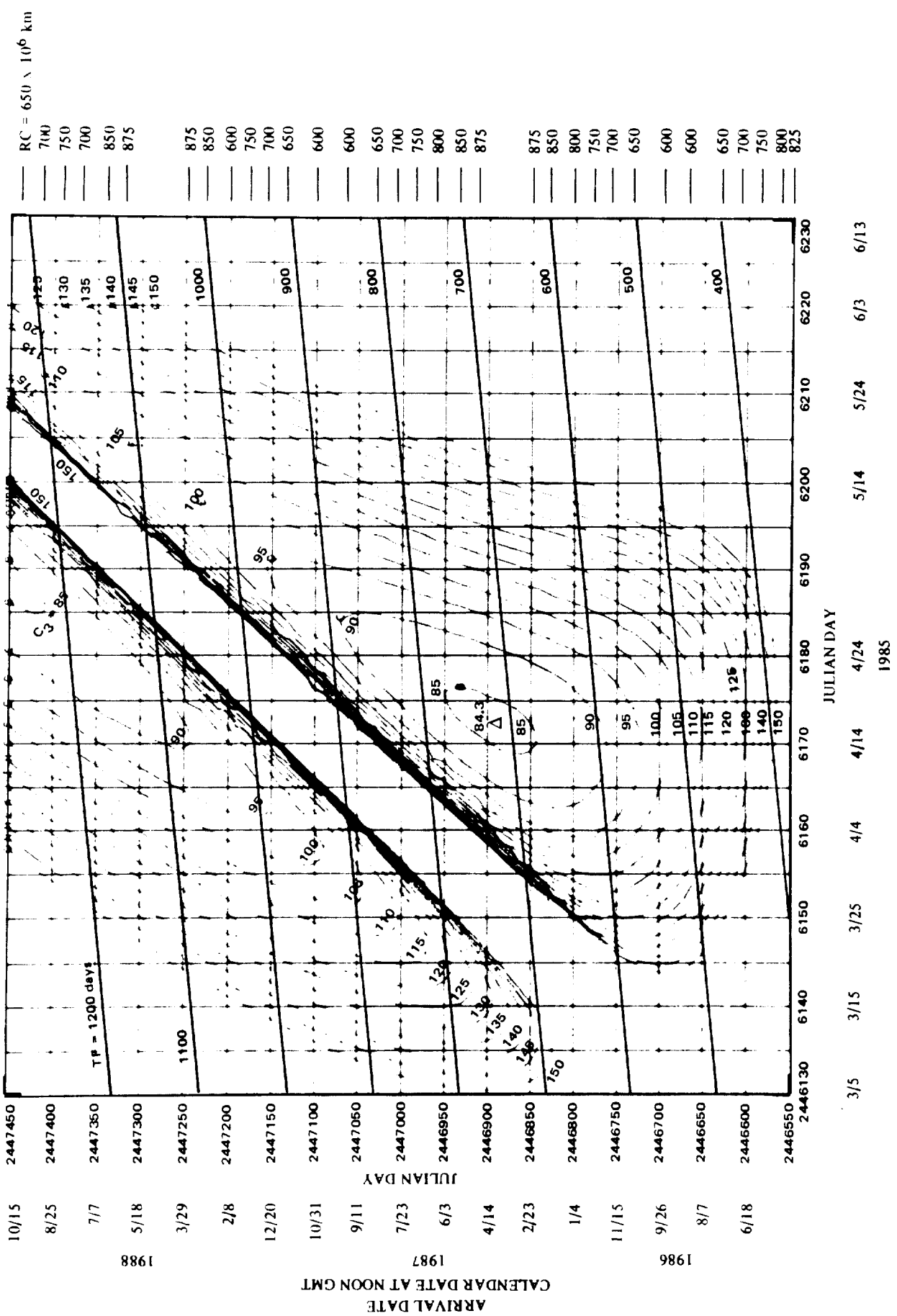


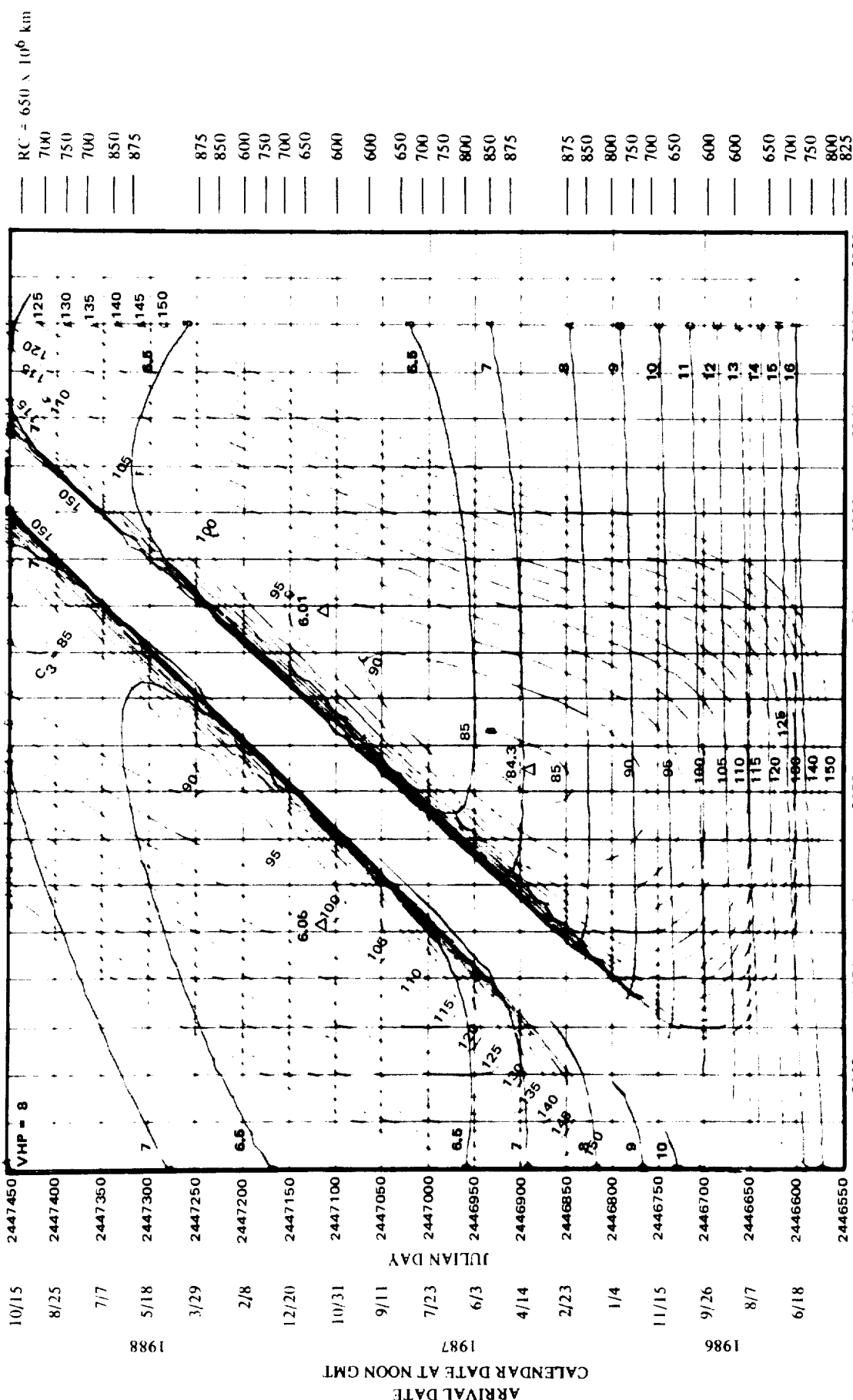
CONTOURS OF  $C_3$  AND SGI EARTH JUPITER 1984

RC =  $625 \times 10^6$  km









10/15 8/25 7/7 5/18 3/29 2/8 12/20 10/31 9/11 7/23 6/3 4/14 2/23 1/4 11/15 9/26 8/7 6/18  
 1988  
 1987  
 1986

2447450  
 2447400  
 2447350  
 2447300  
 2447250  
 2447200  
 2447150  
 2447100  
 2447050  
 2447000  
 2446950  
 2446900  
 2446850  
 2446800  
 2446750  
 2446700  
 2446650  
 2446600  
 2446550

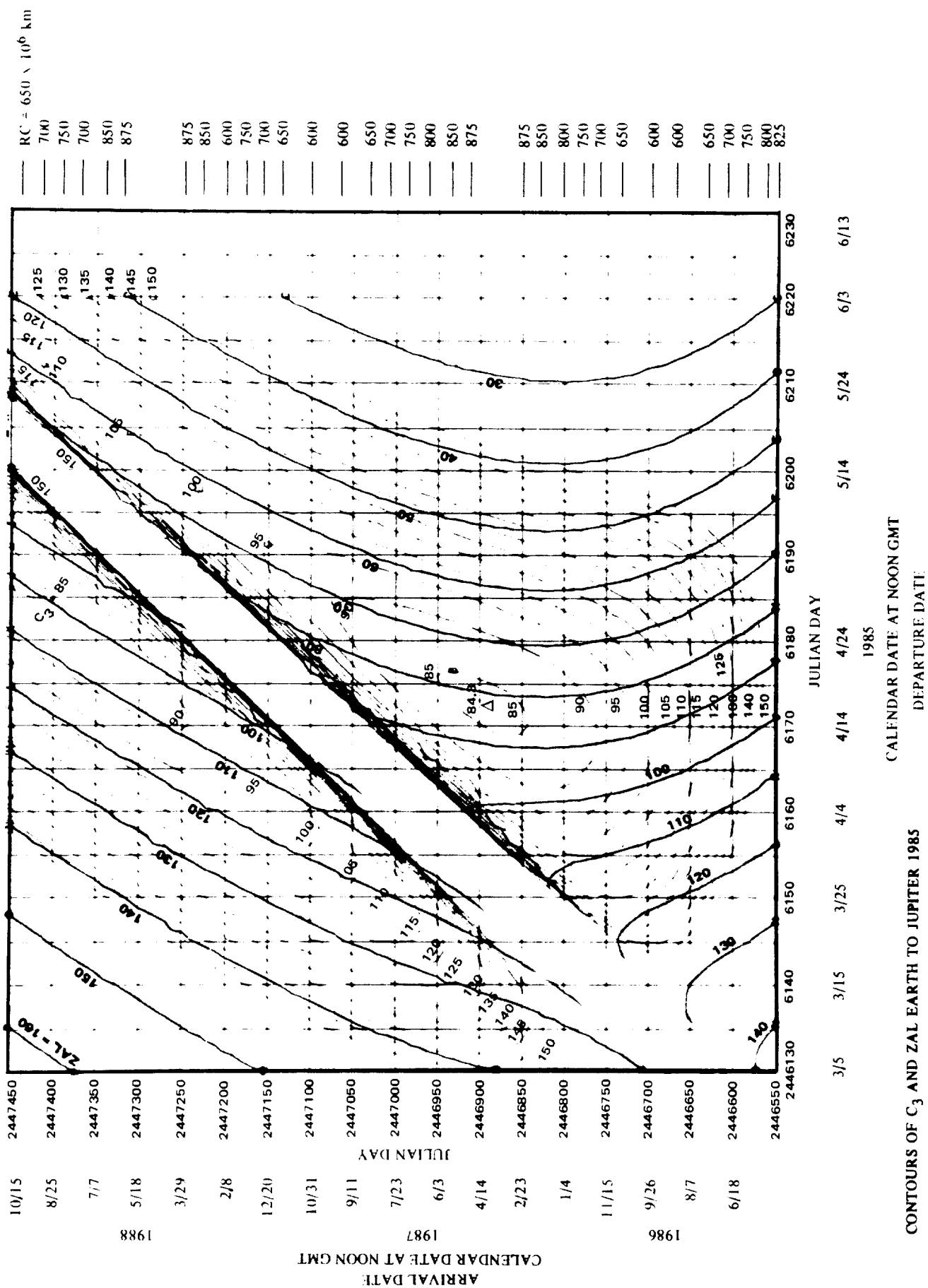
6130 6140 6150 6160 6170 6180 6190 6200 6210 6220 6230

3/5 3/15 3/25 4/4 4/14 4/24 5/14 5/24 6/3 6/13

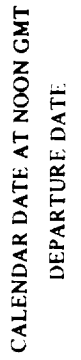
JULIAN DAY  
 1985  
 CALENDAR DATE AT NOON GMT  
 DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND VHP EARTH TO JUPITER 1985

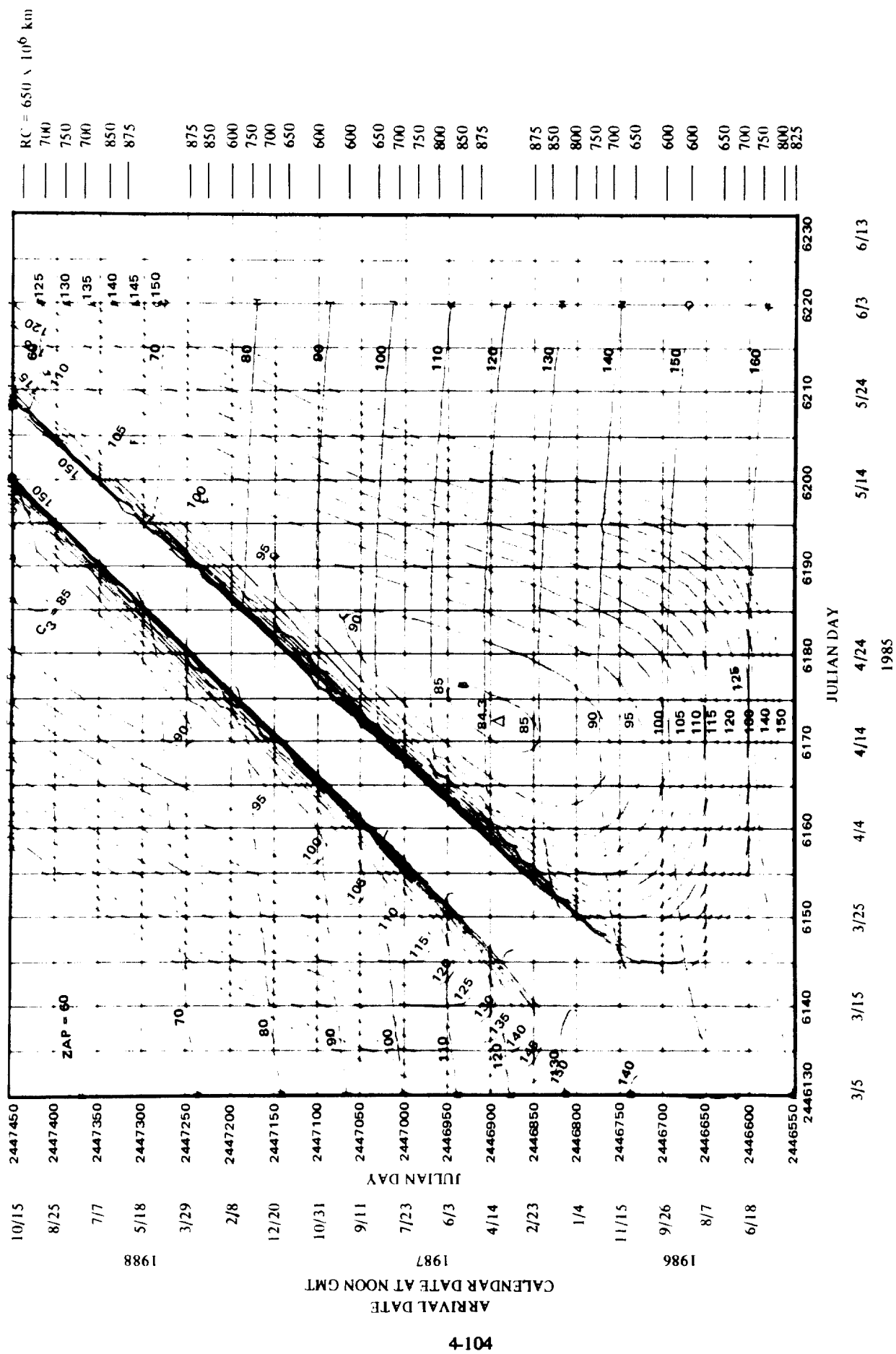








CONTOURS OF C<sub>3</sub> AND INC EARTH TO JUPITER 1985

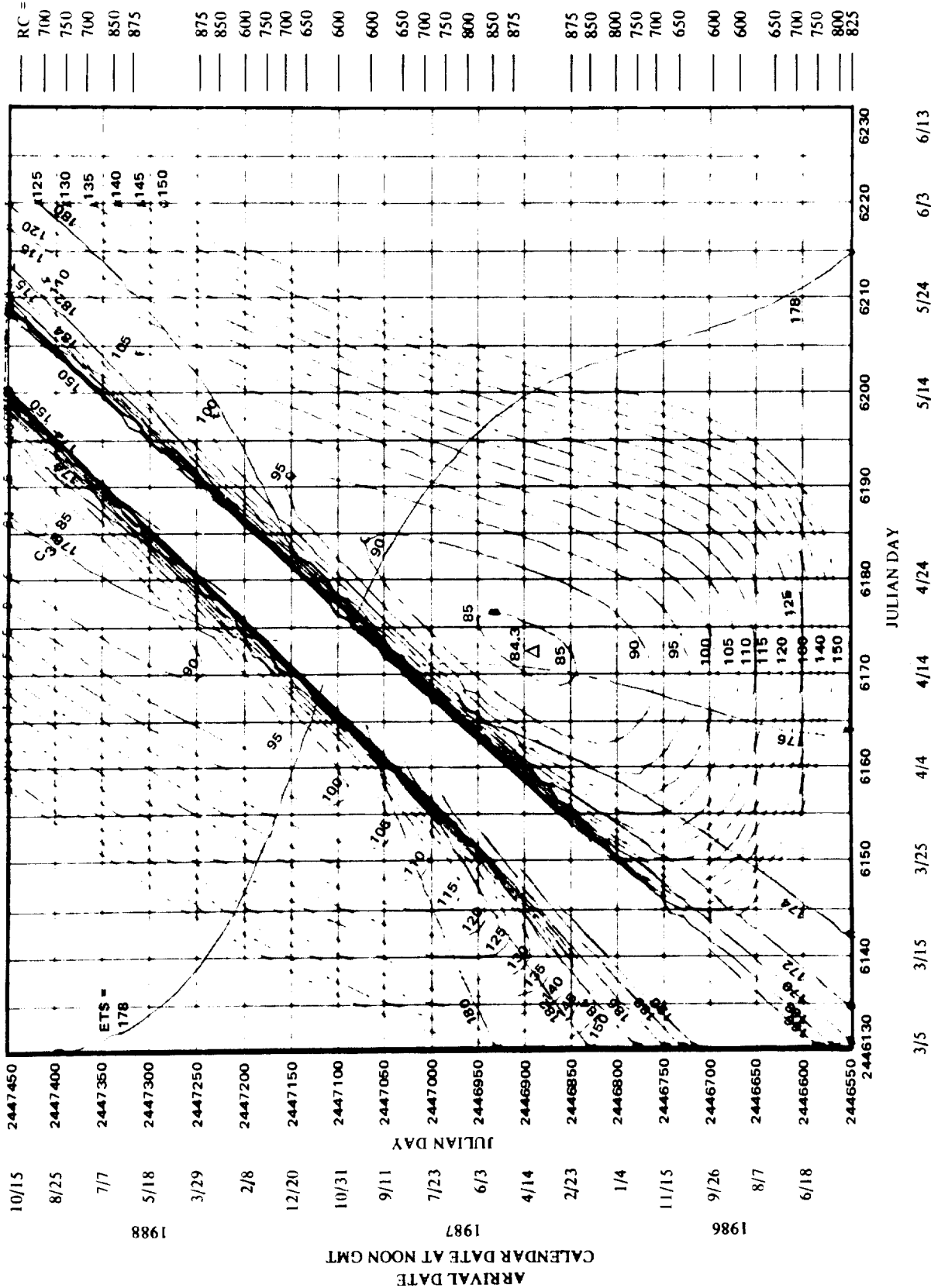


CALENDAR DATE AT NOON GMT

DEPARTURE DATE

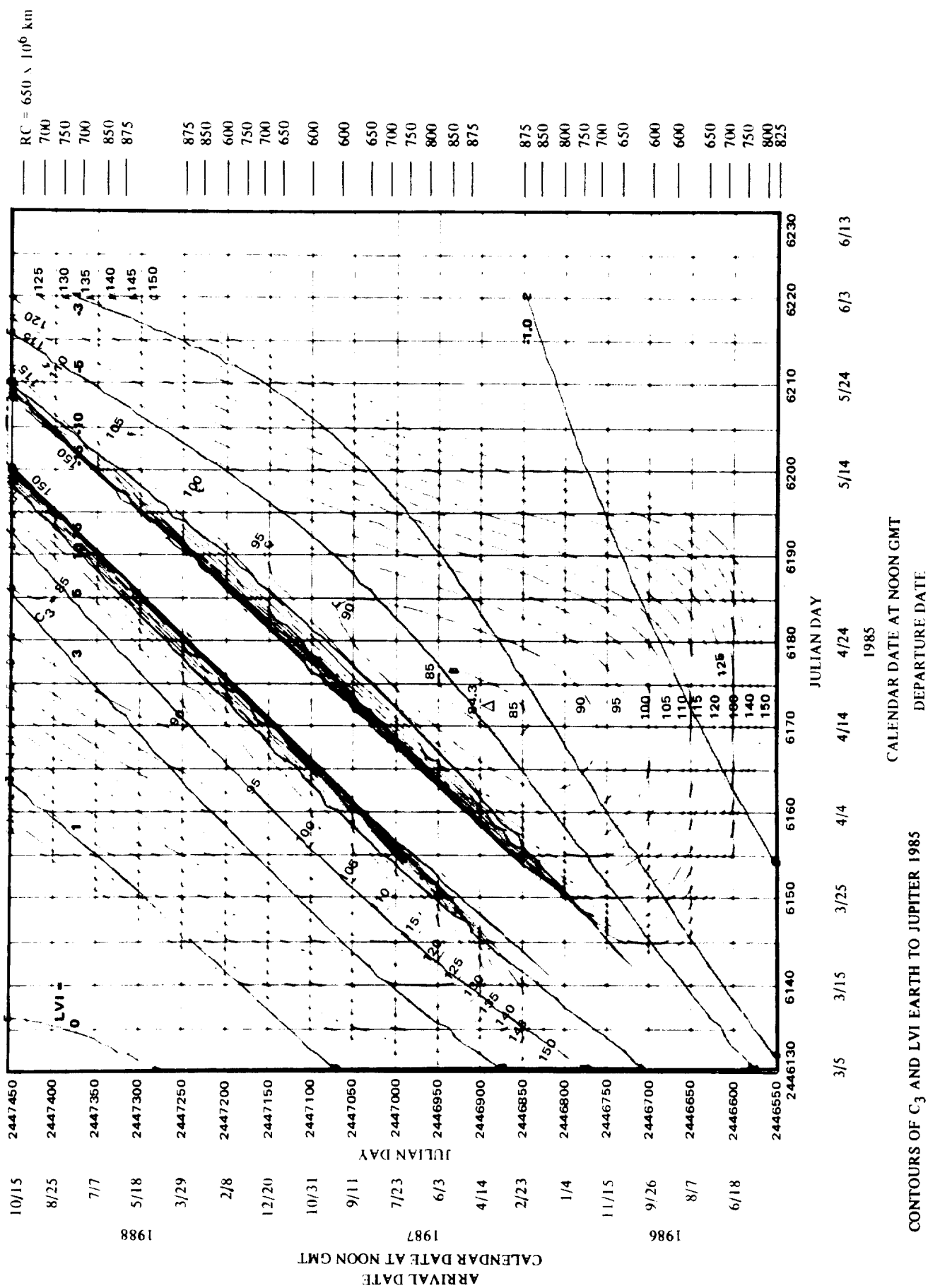
CONTOURS OF  $C_3$  AND ZAP EARTH TO JUPITER 1985

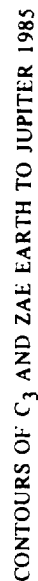
RC = 650 x 10<sup>6</sup> km

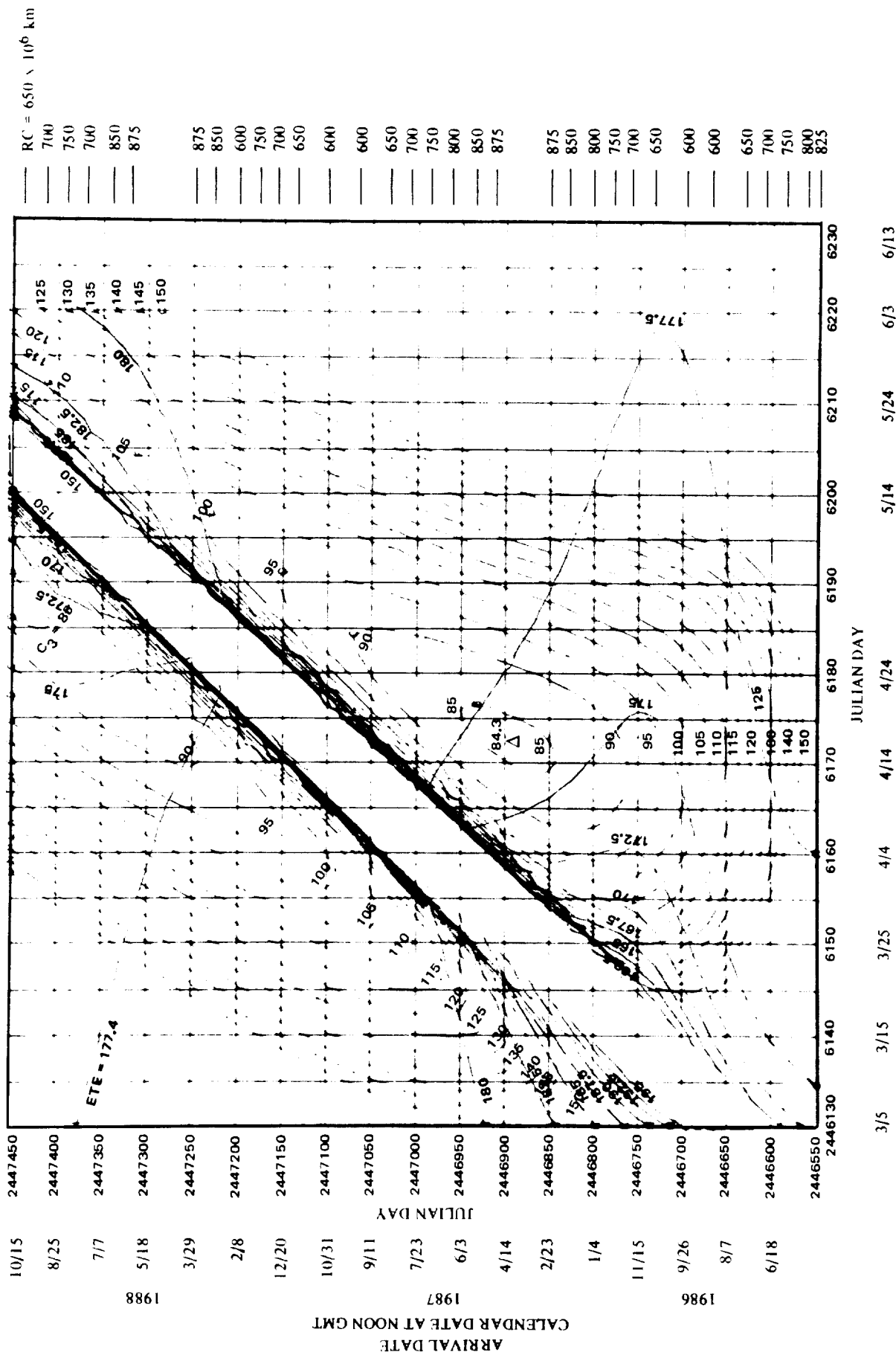


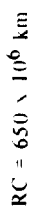
CALENDAR DATE AT NOON GMT  
1985  
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND ETS EARTH TO JUPITER 1985







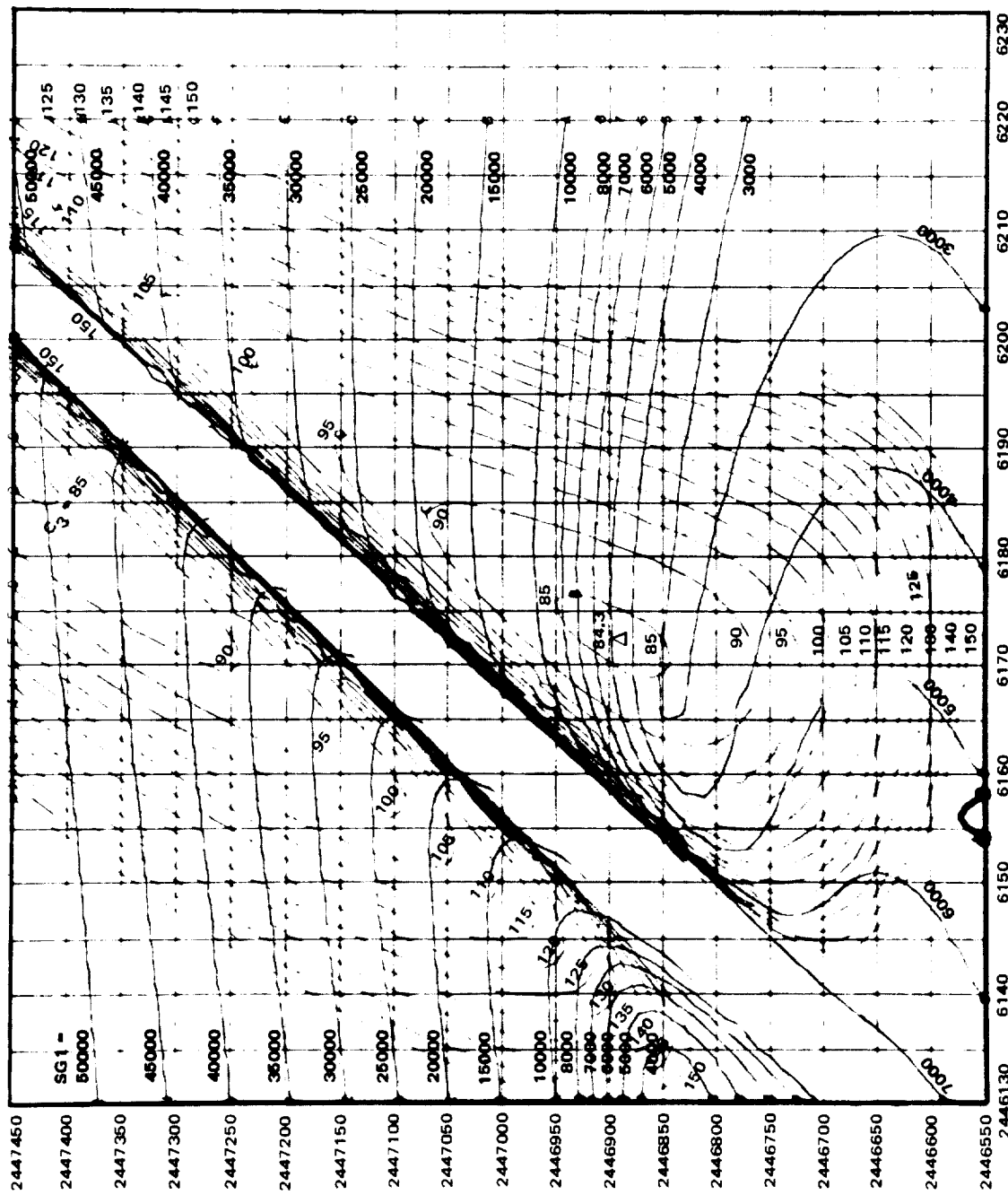
CONTOURS OF  $C_3$  AND THA EARTH TO JUPITER 1985

RC = 650 x 10<sup>6</sup> km

700  
750  
700  
850  
875

875  
850  
600  
750  
700  
650  
600  
600  
650  
700  
750  
800  
850  
875

875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
850  
875



10/15 2447450  
8/25 2447400  
7/7 2447350  
5/18 2447300  
3/29 2447250  
2/8 2447200  
12/20 2447150  
10/31 2447100  
9/11 2447050  
7/23 2447000  
6/3 2446950  
4/14 2446900  
2/23 2446850  
1/4 2446800  
11/15 2446750  
9/26 2446700  
8/7 2446650  
6/18 2446600  
2446550

JULIAN DAY

6140 6150 6160 6170 6180 6190 6200 6210 6220 6230

3/5 3/15 3/25 4/4 4/14 4/24 5/14 5/24 6/3 6/13

1988

1987

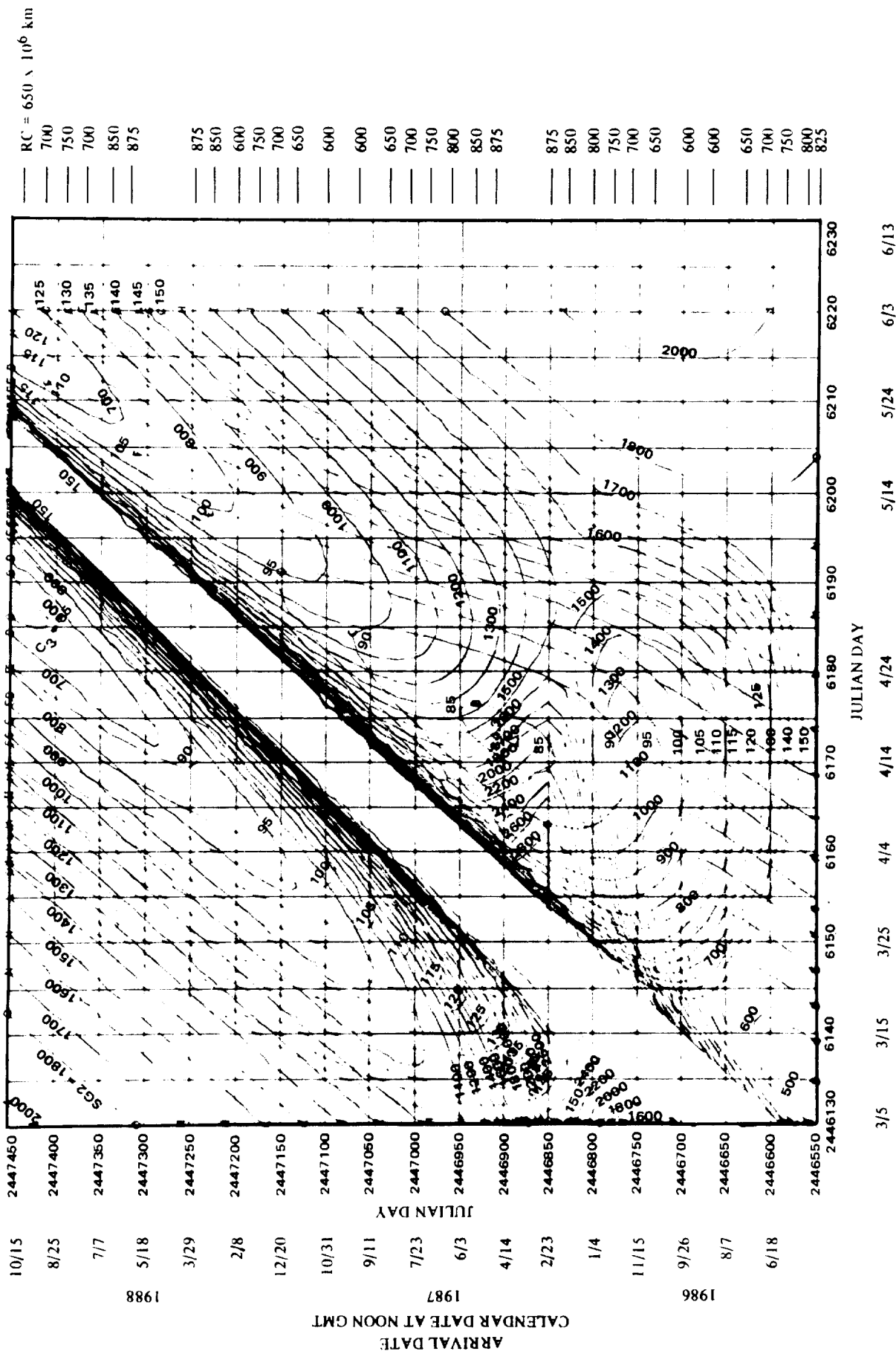
1986

ARRIVAL DATE  
AT NOON GMT

CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND SG1 EARTH TO JUPITER 1985

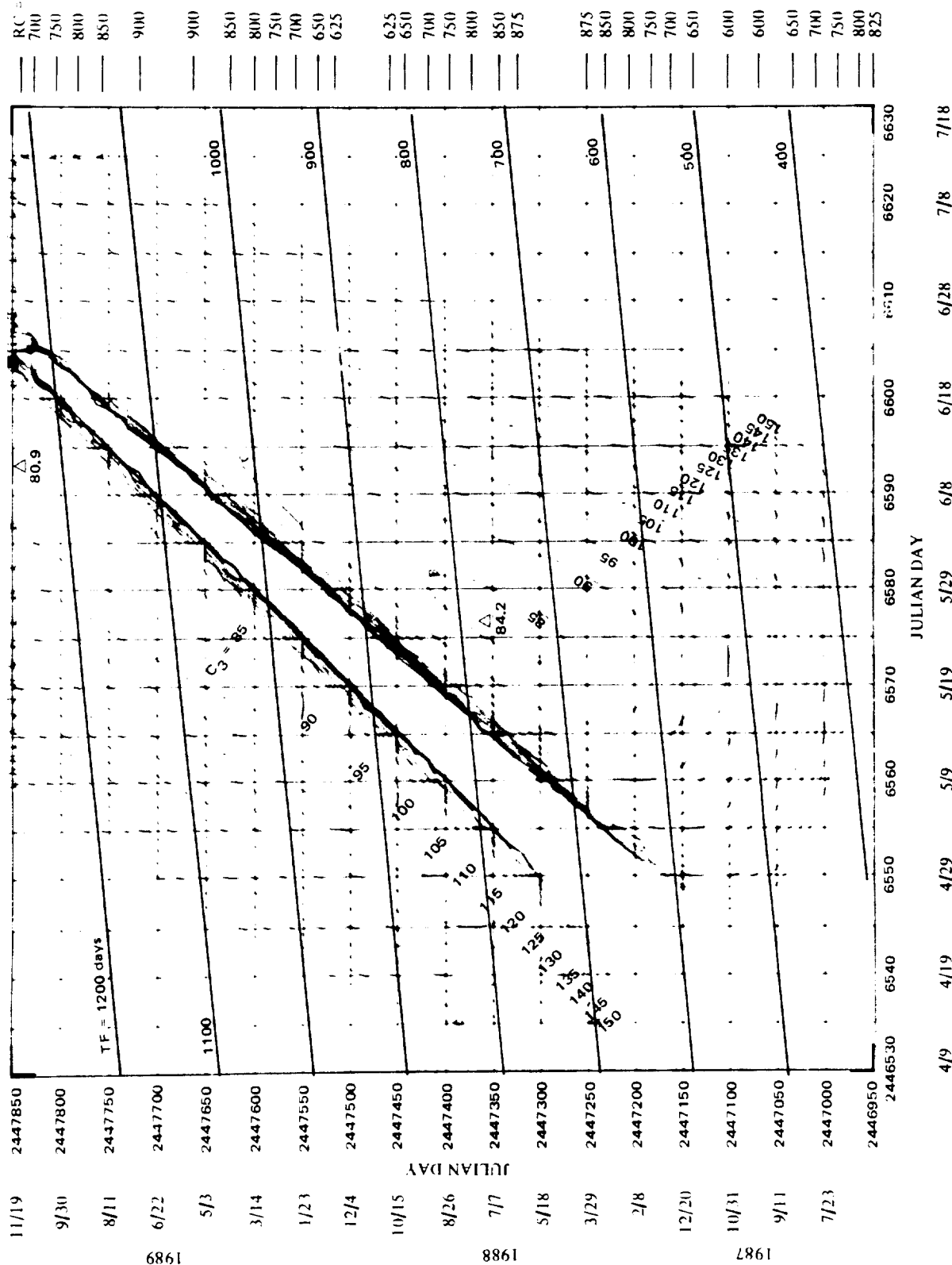




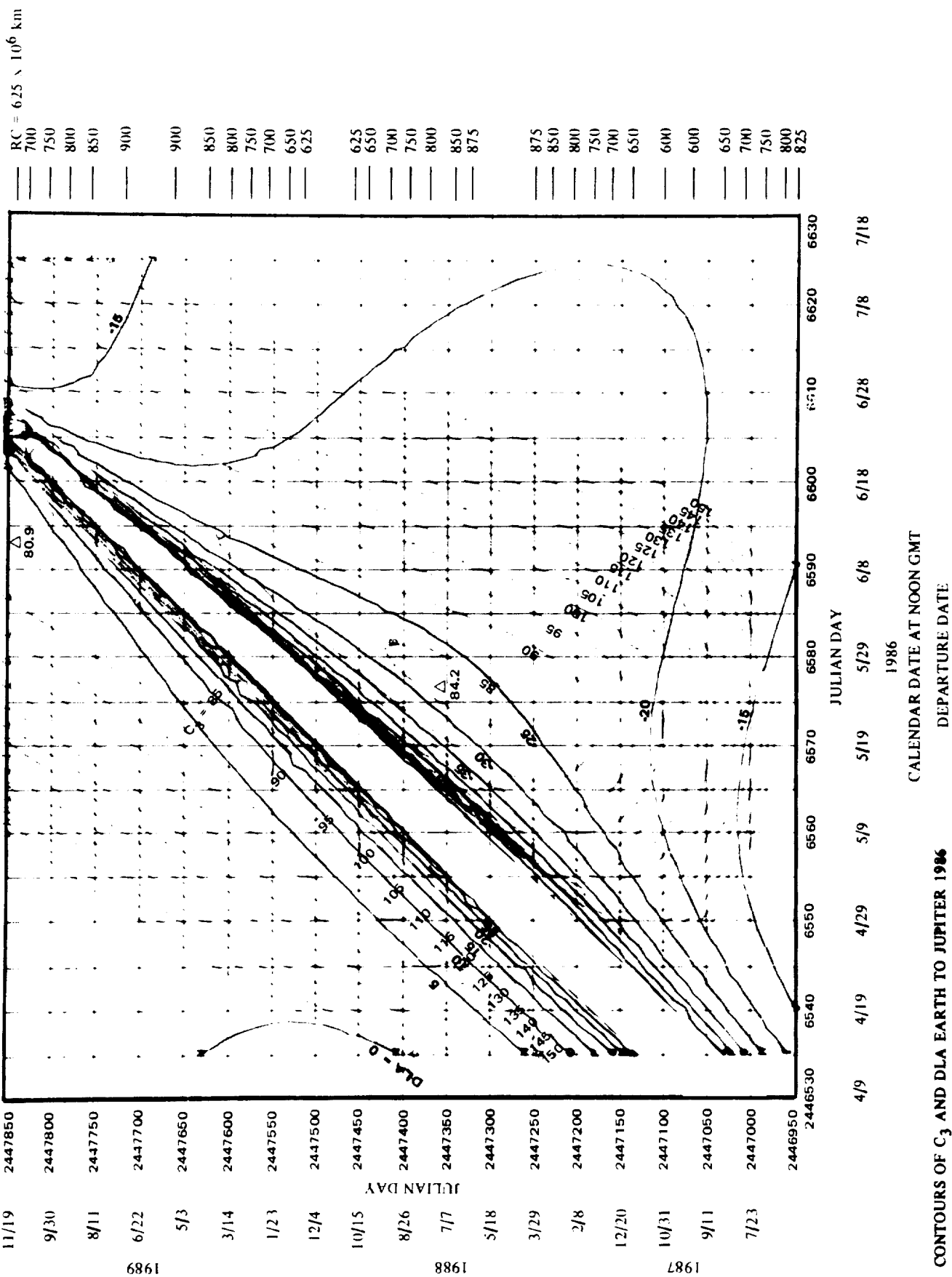
CONTOURS OF  $C_3$  AND SG2 EARTH TO JUPITER 1985



RC = 6.25 x 10<sup>6</sup> km





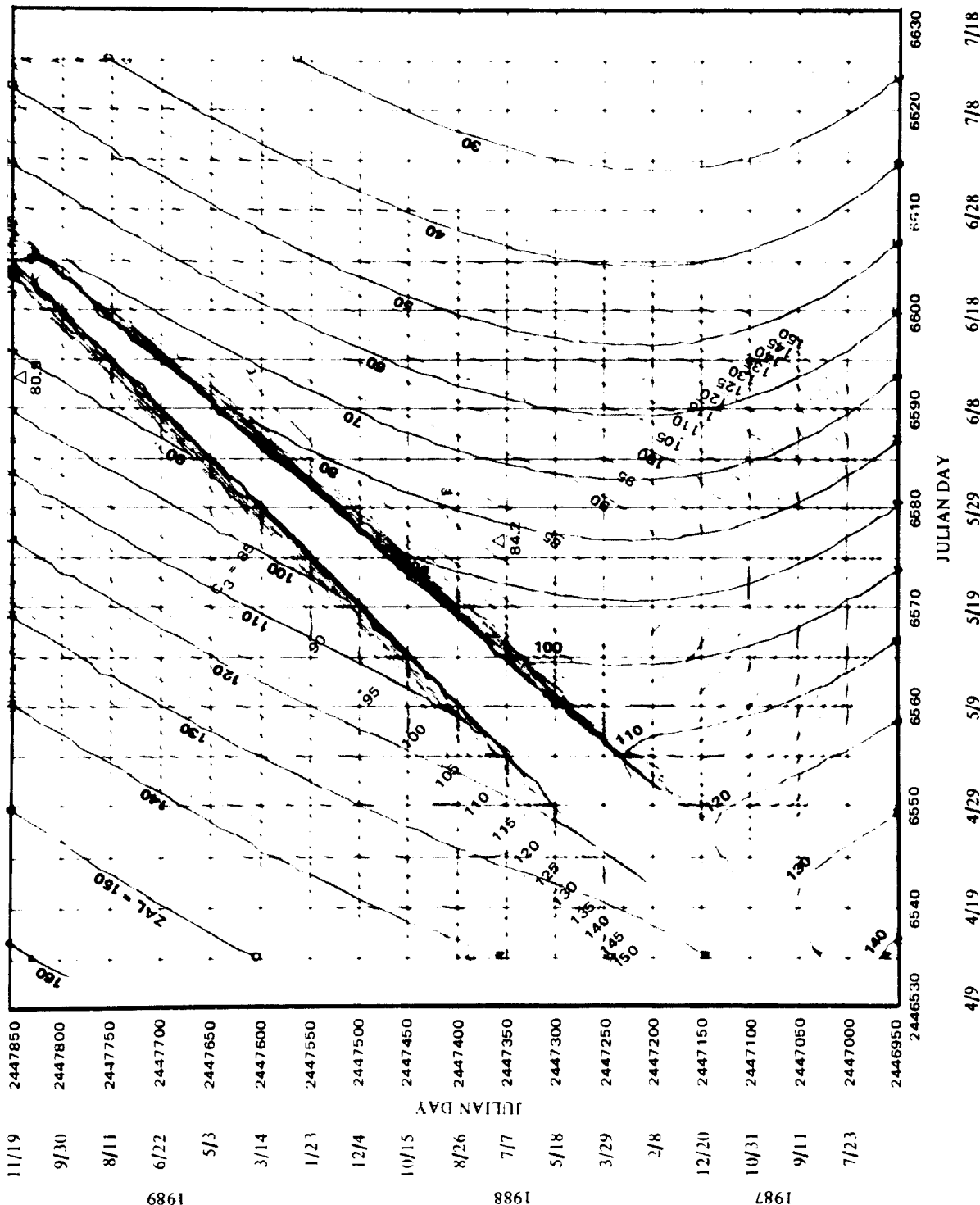
CONTOURS OF  $C_3$  AND DLA EARTH TO JUPITER 1986

CALENDAR DATE AT NOON GMT

DEPARTURE DATE

RC = 6.25 x 10<sup>6</sup> km

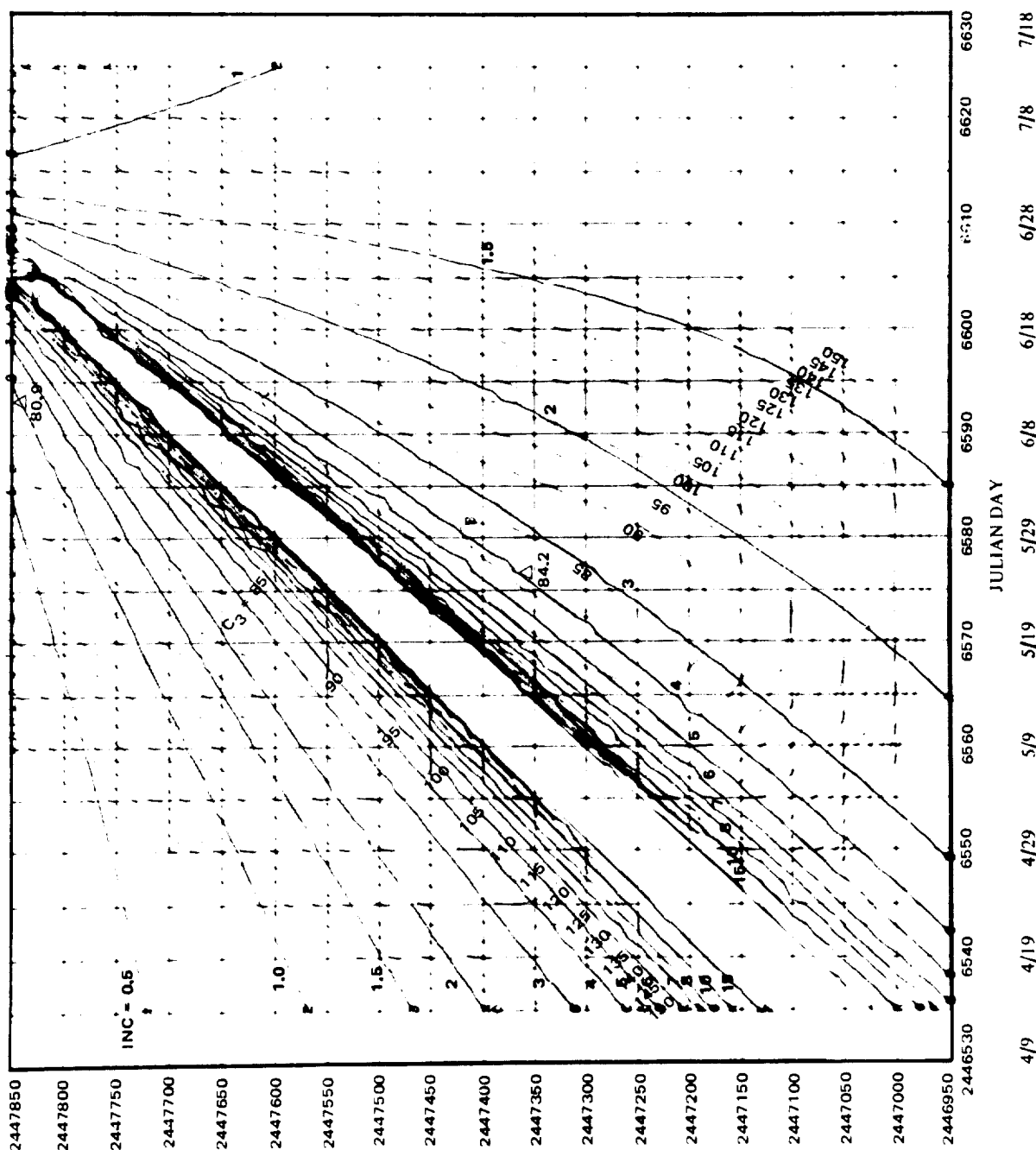
700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825



CONTOURS OF C<sub>3</sub> AND ZAL EARTH TO JUPITER 1986

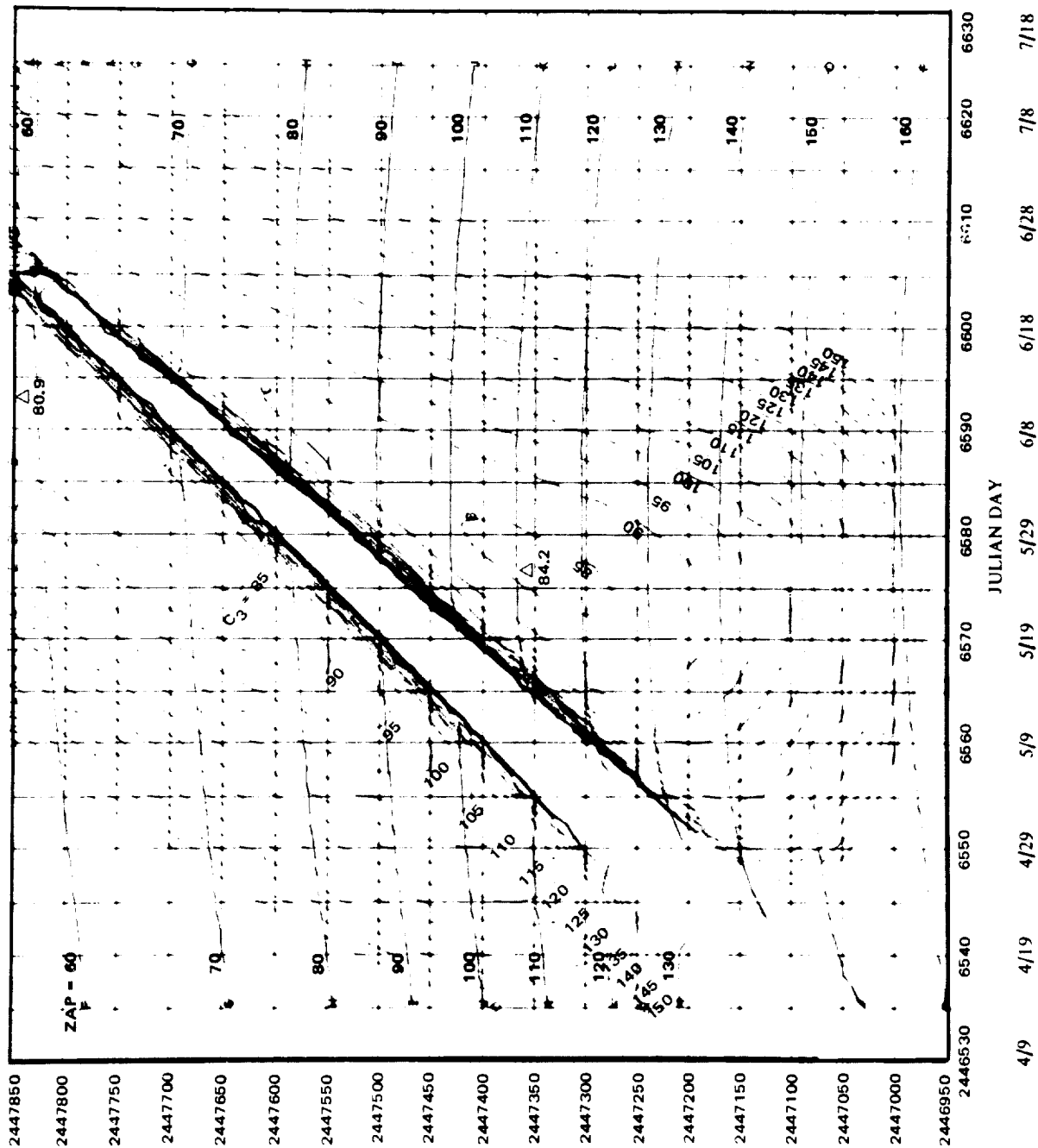
RC = 625 x 10<sup>6</sup> km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825



RC =  $625 \times 10^6$  km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825



JULIAN DAY

4/9 4/19 4/29 5/9 5/19 5/29 6/8 6/18 6/28 7/8 7/18

1986

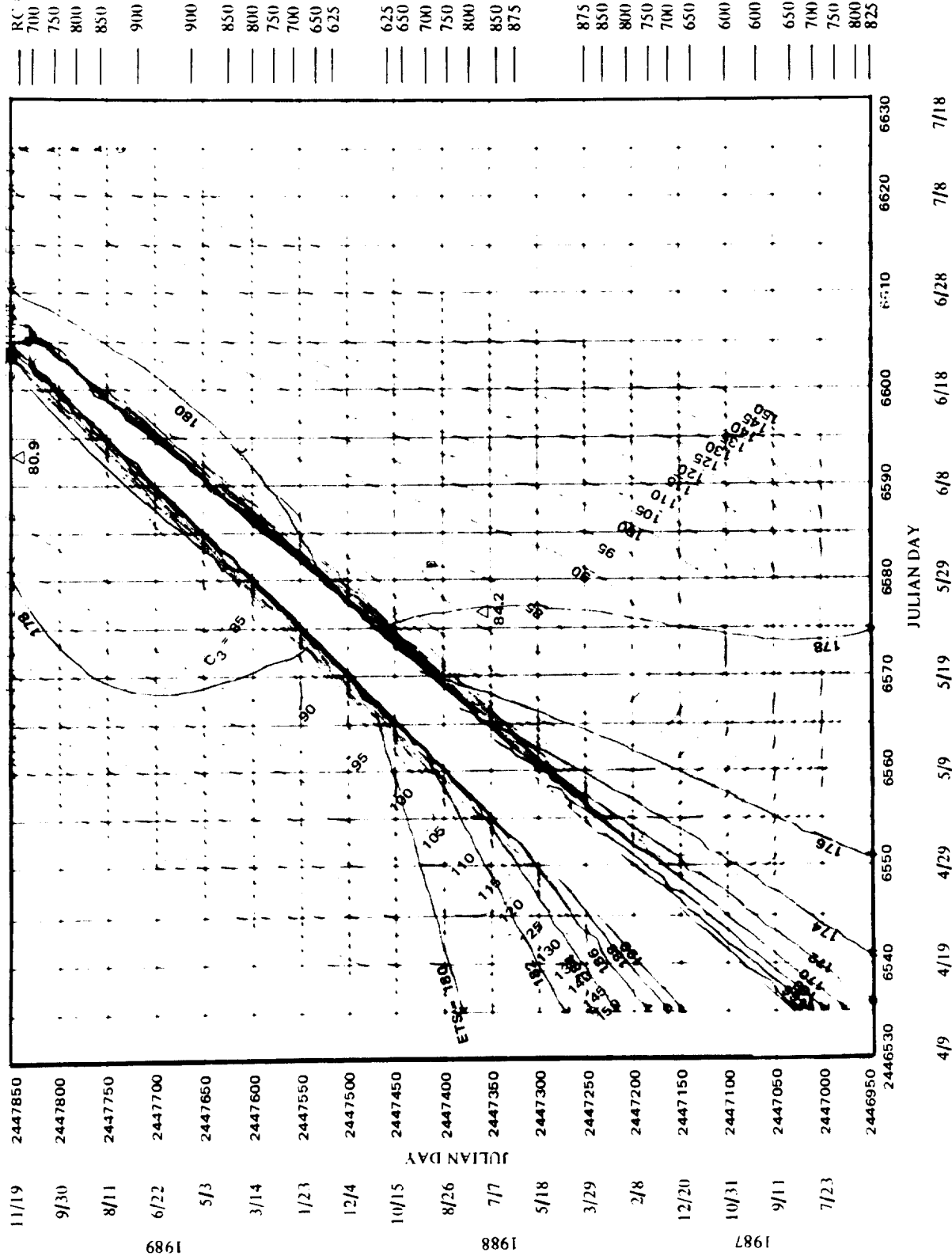
CALENDAR DATE AT NOON GMT

DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND ZAP EARTH TO JUPITER 1986

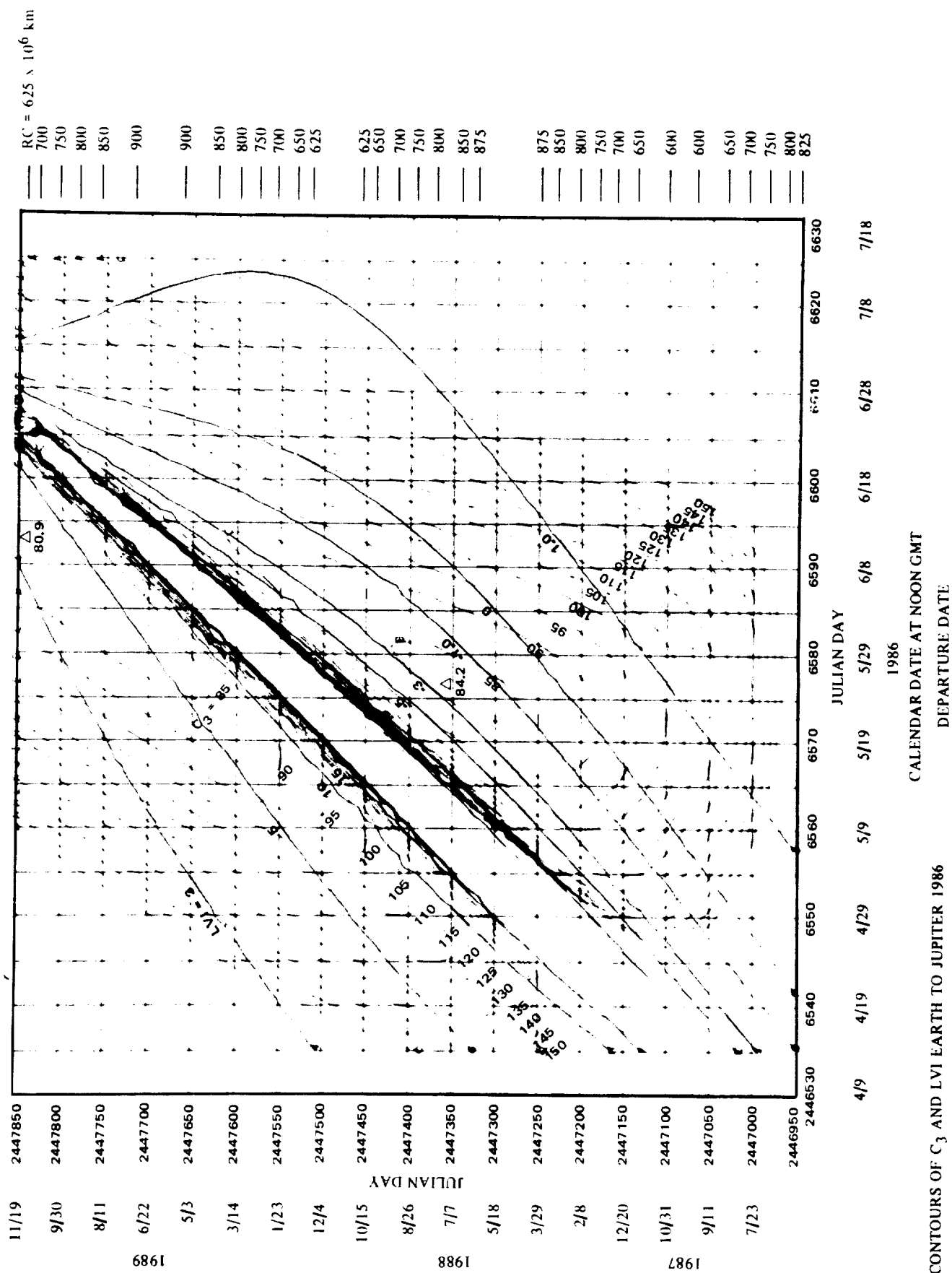


RC = 625 x 10<sup>6</sup> km



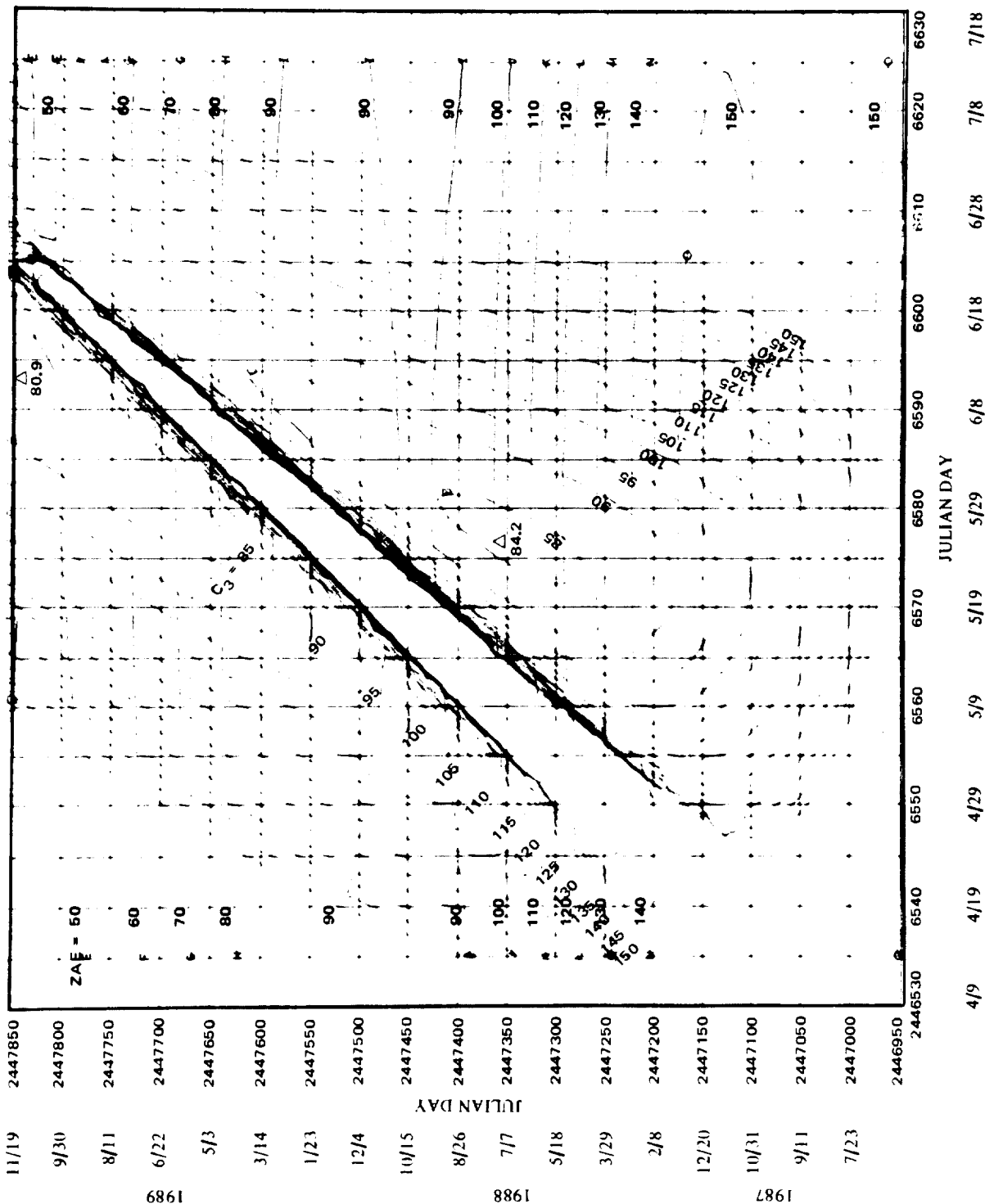
1986  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND ETS EARTH TO JUPITER 1986



RC =  $6.25 \times 10^6$  km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825

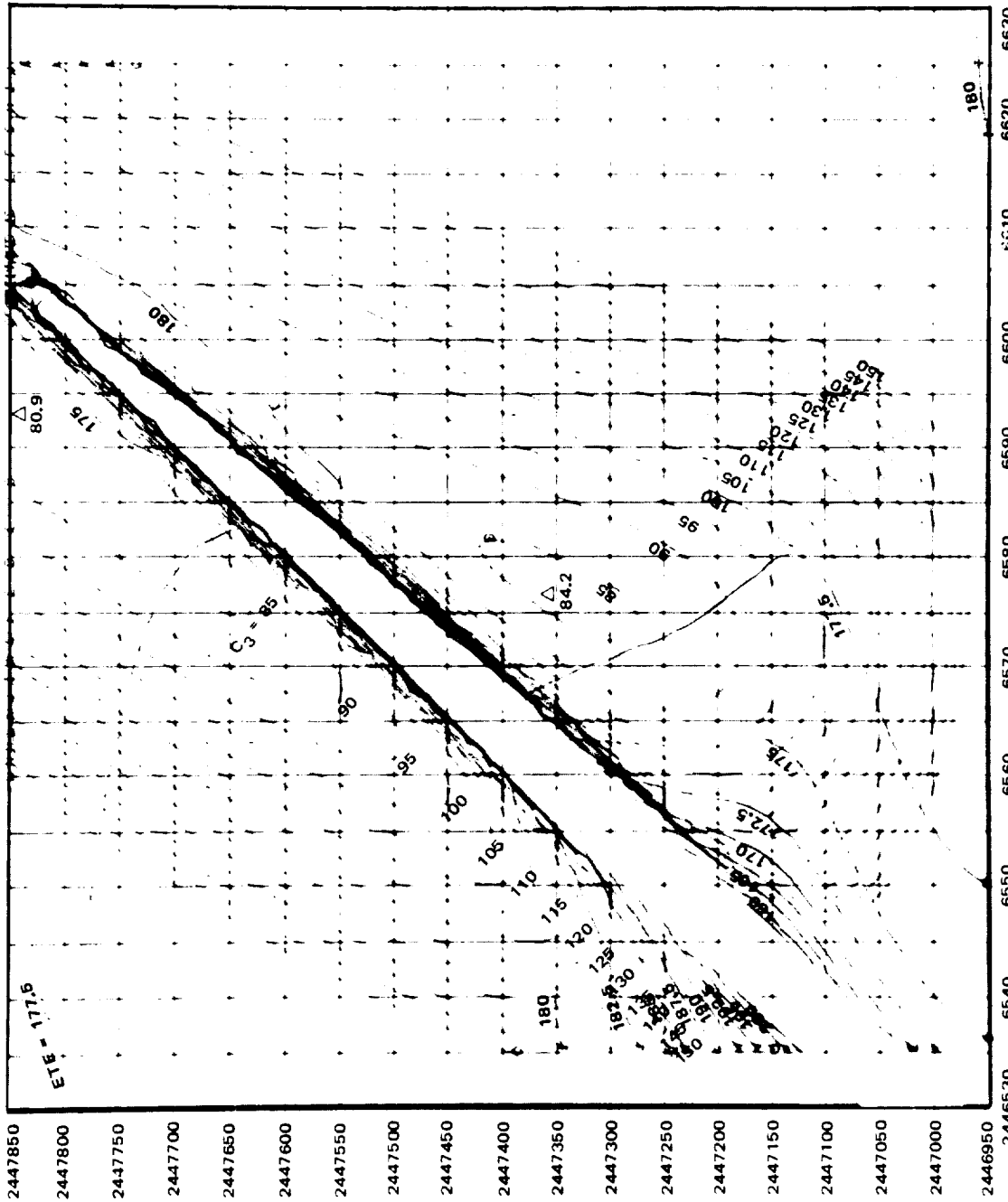


1986  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF  $C_3$  AND ZAE EARTH TO JUPITER 1986

RC =  $625 \times 10^6$  km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825



JULIAN DAY

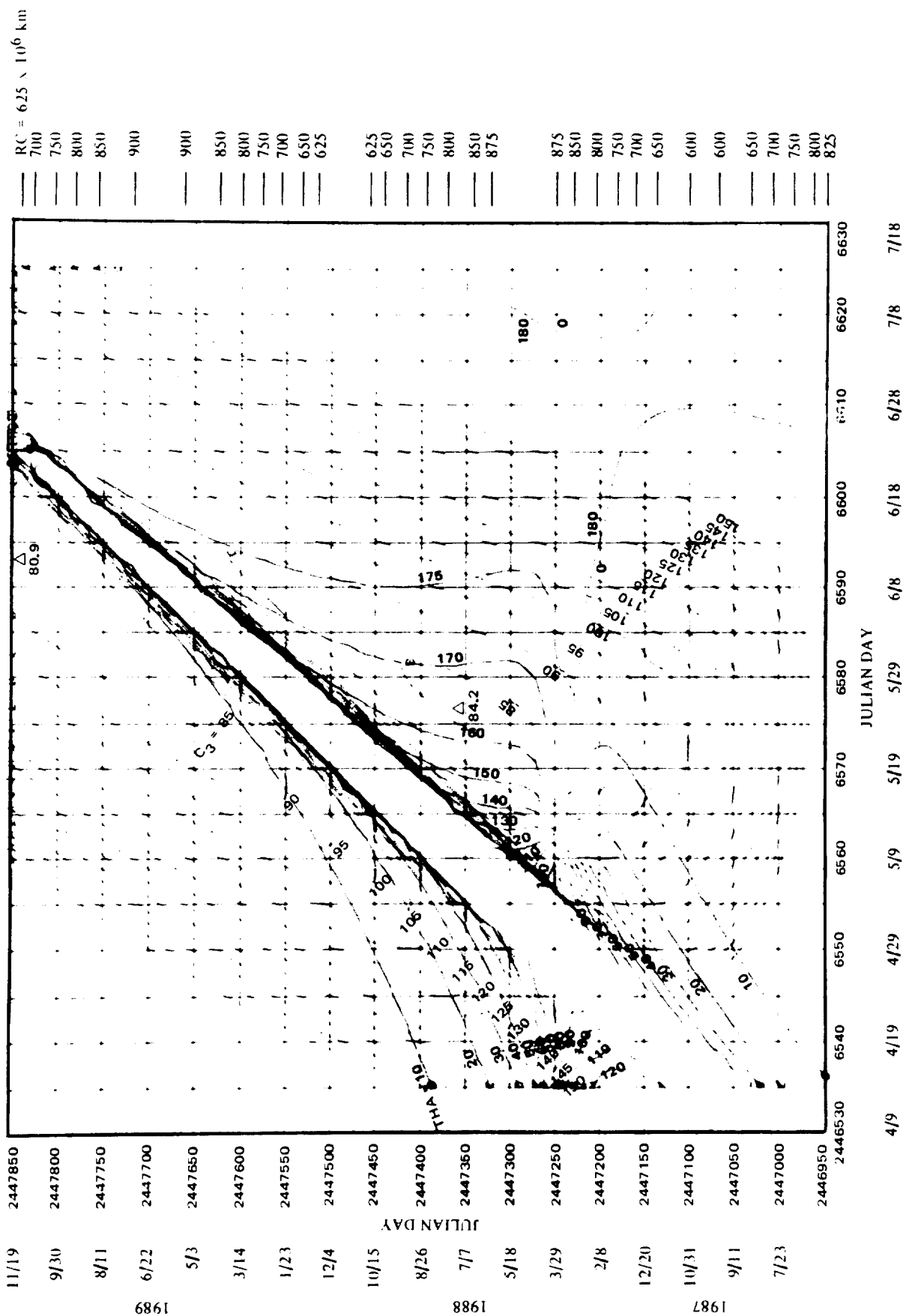
4/9 4/19 4/29 5/9 5/19 5/29 6/8 6/18 6/28 7/8 7/18

1986

CALENDAR DATE AT NOON GMT

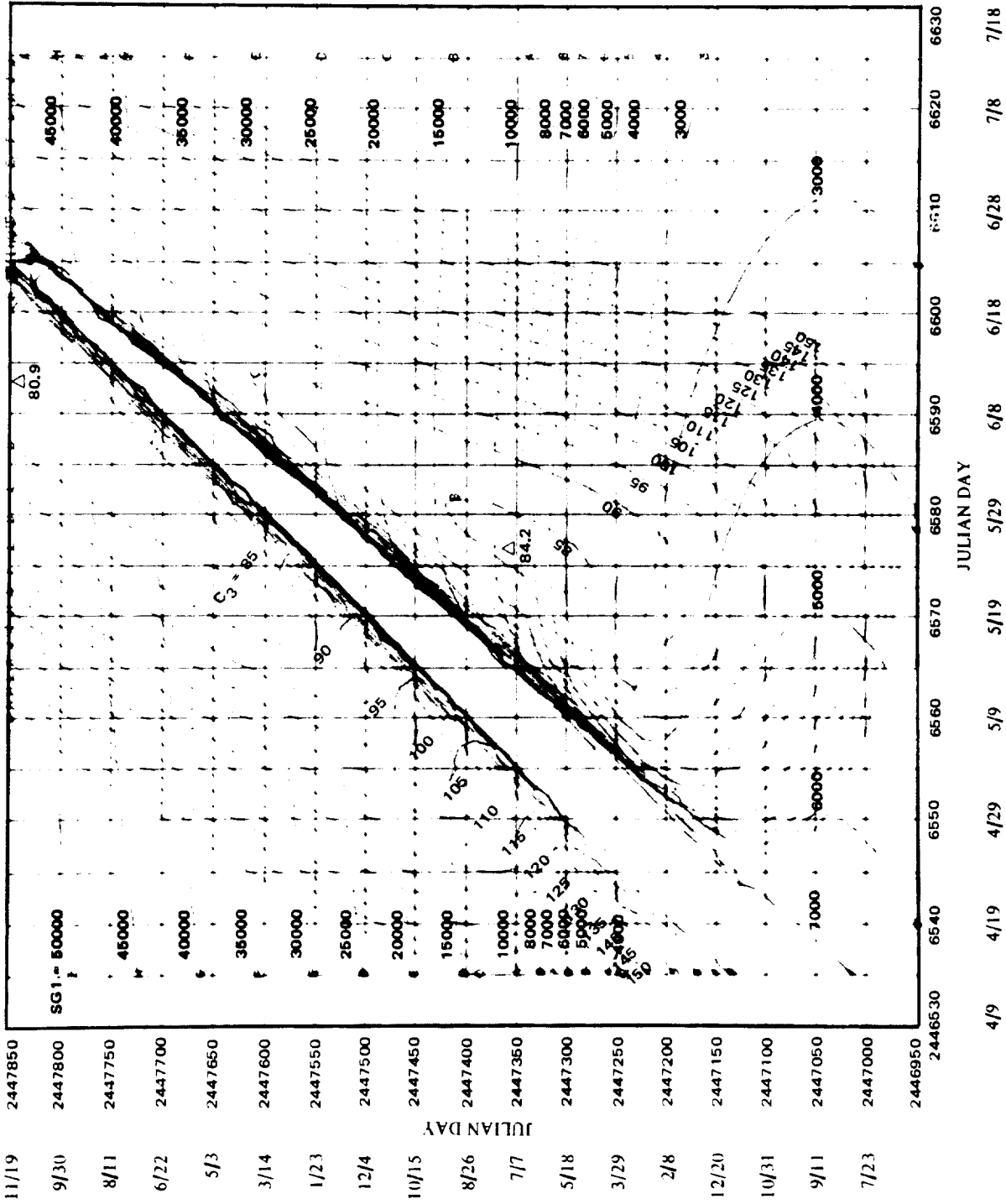
DEPARTURE DATE

CONTOURS OF  $C_3$  AND ETE EARTH TO JUPITER 1986



RC =  $6.25 \times 10^6$  km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825

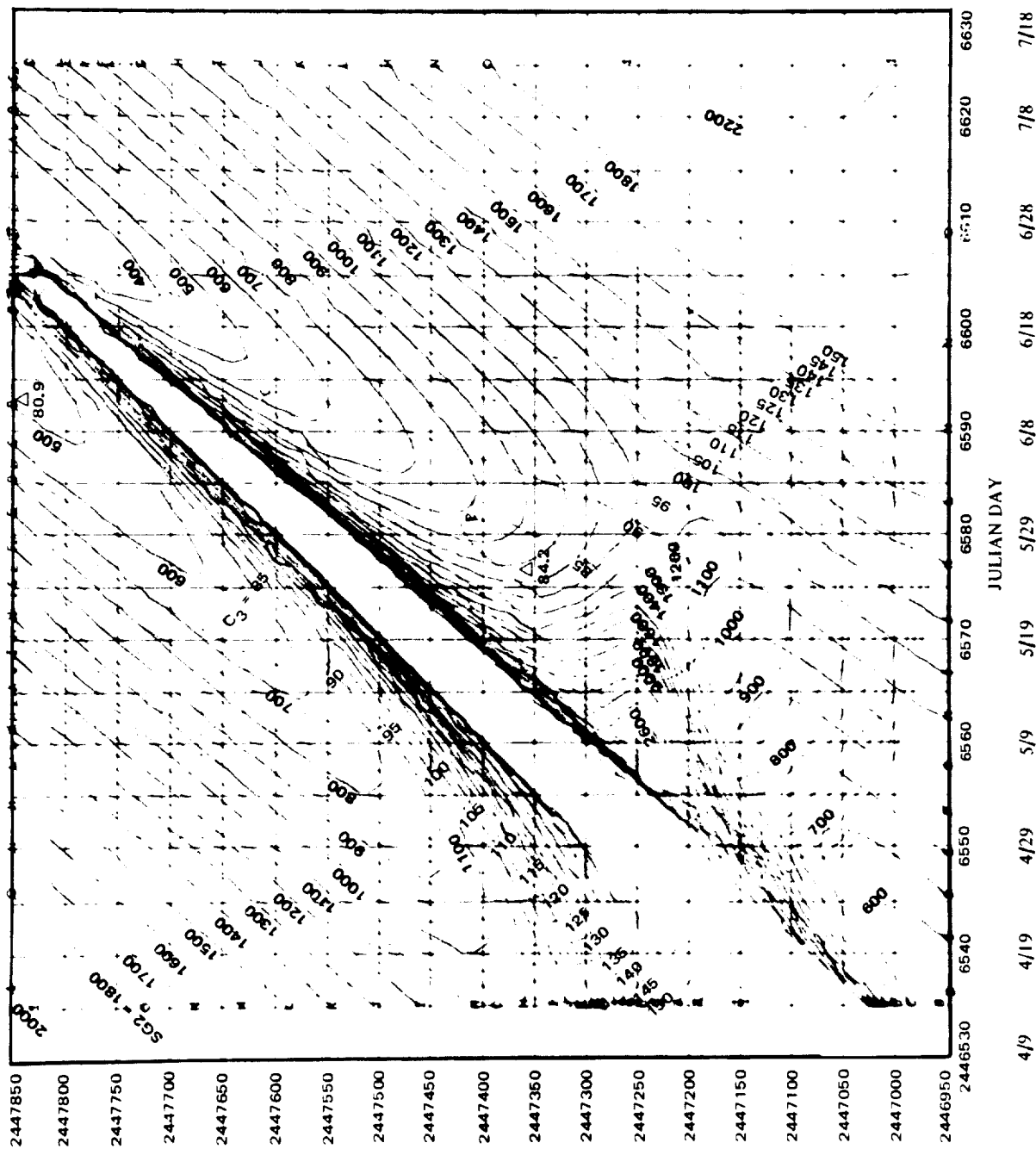


CALENDAR DATE AT NOON GMT  
DEPARTURE DATE  
1986

CONTOURS OF C<sub>3</sub> AND SG1 EARTH TO JUPITER 1986

RC =  $6.25 \times 10^6$  km

700 750 800 850 900 900 850 800 750 700 650 625 625 650 700 750 800 850 875 875 850 800 750 700 650 600 600 650 700 750 800 825

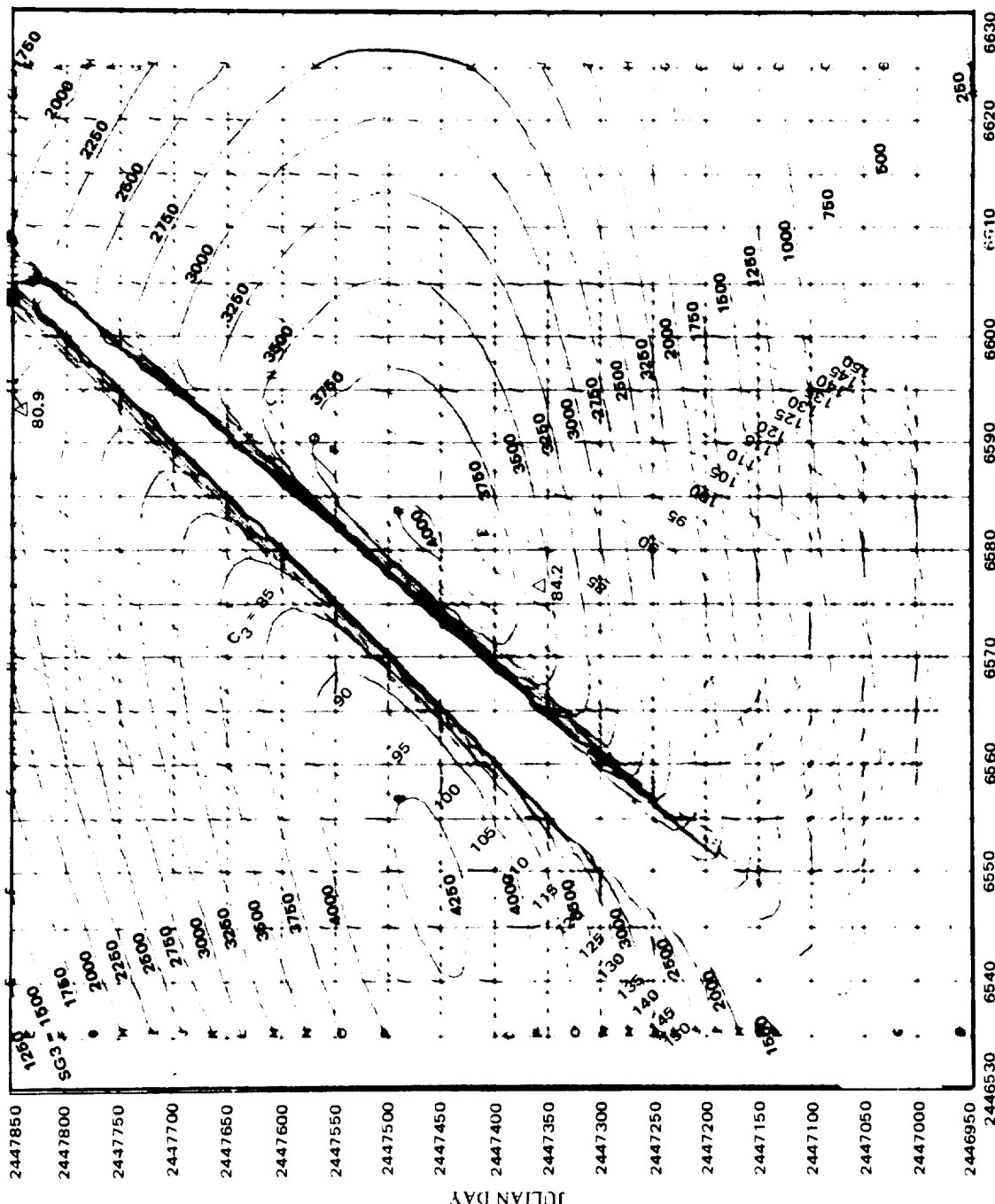


1986  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF  $C_3$  AND SG2 EARTH TO JUPITER 1986

RC =  $6.25 \times 10^6$  km

700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
875  
875  
850  
800  
750  
700  
650  
600  
600  
650  
700  
750  
800  
825



11/19 2447850  
9/30 2447800  
8/11 2447750  
6/22 2447700  
5/3 2447650  
3/14 2447600  
1/23 2447550  
12/4 2447500  
10/15 2447450  
8/26 2447400  
7/7 2447350  
5/18 2447300  
3/29 2447250  
2/8 2447200  
12/20 2447150  
10/31 2447100  
9/11 2447050  
7/23 2447000  
2446950

JULIAN DAY

4/9 4/19 4/29 5/9 5/19 5/29 6/8 6/18 6/28 7/8 7/18

1986

CALENDAR DATE AT NOON GMT

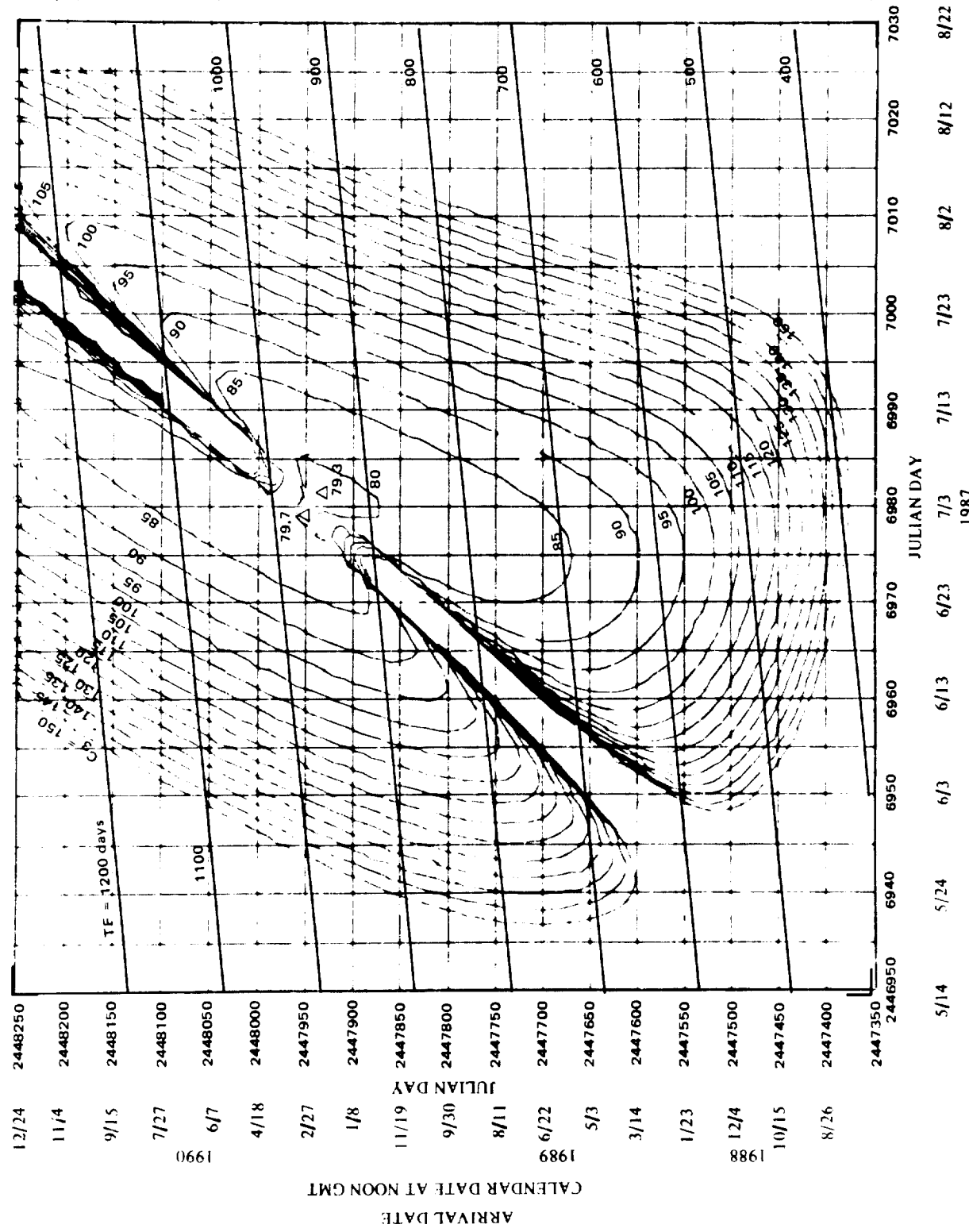
DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND SG3 EARTH TO JUPITER 1986

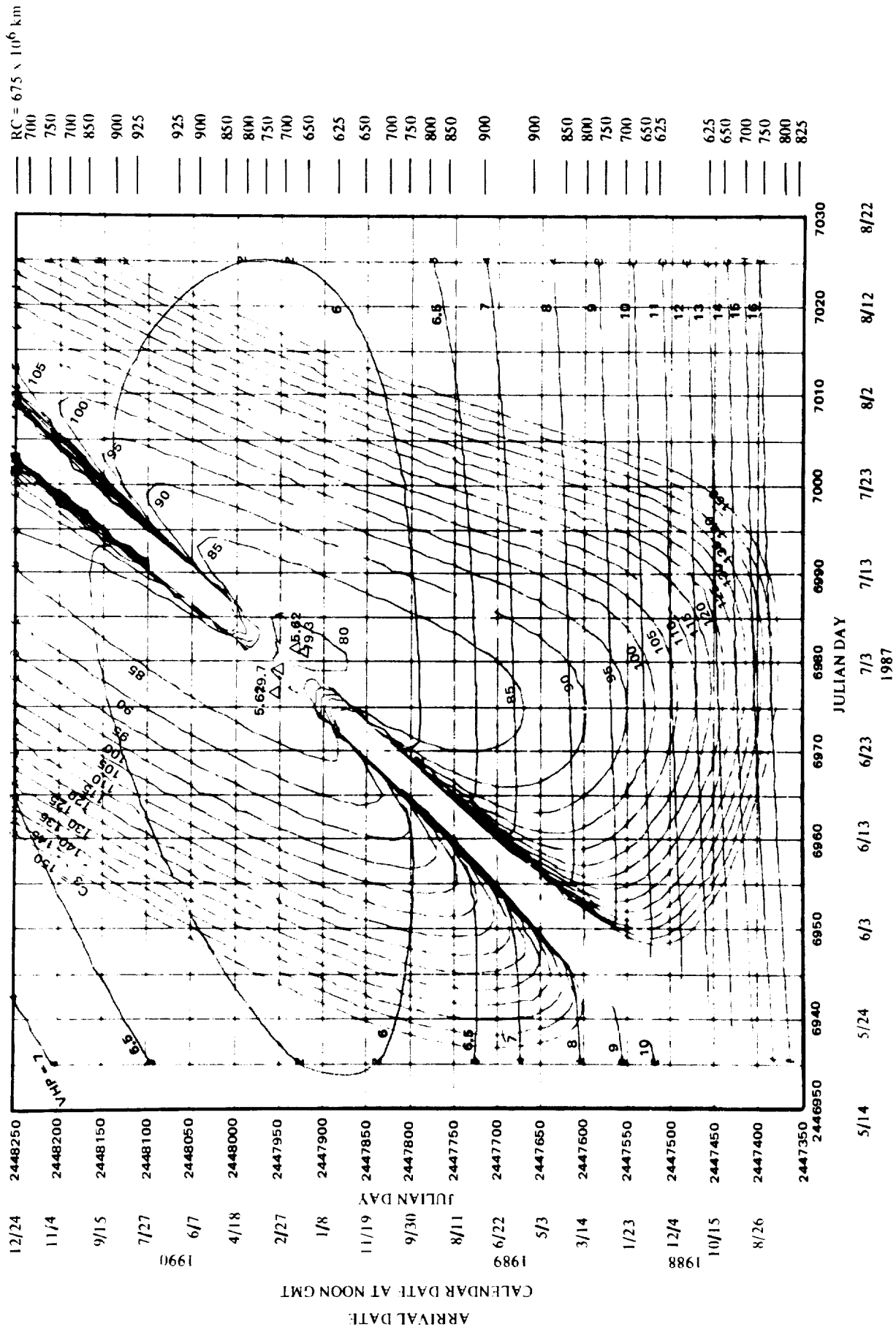


RC =  $675 \times 10^6$  km

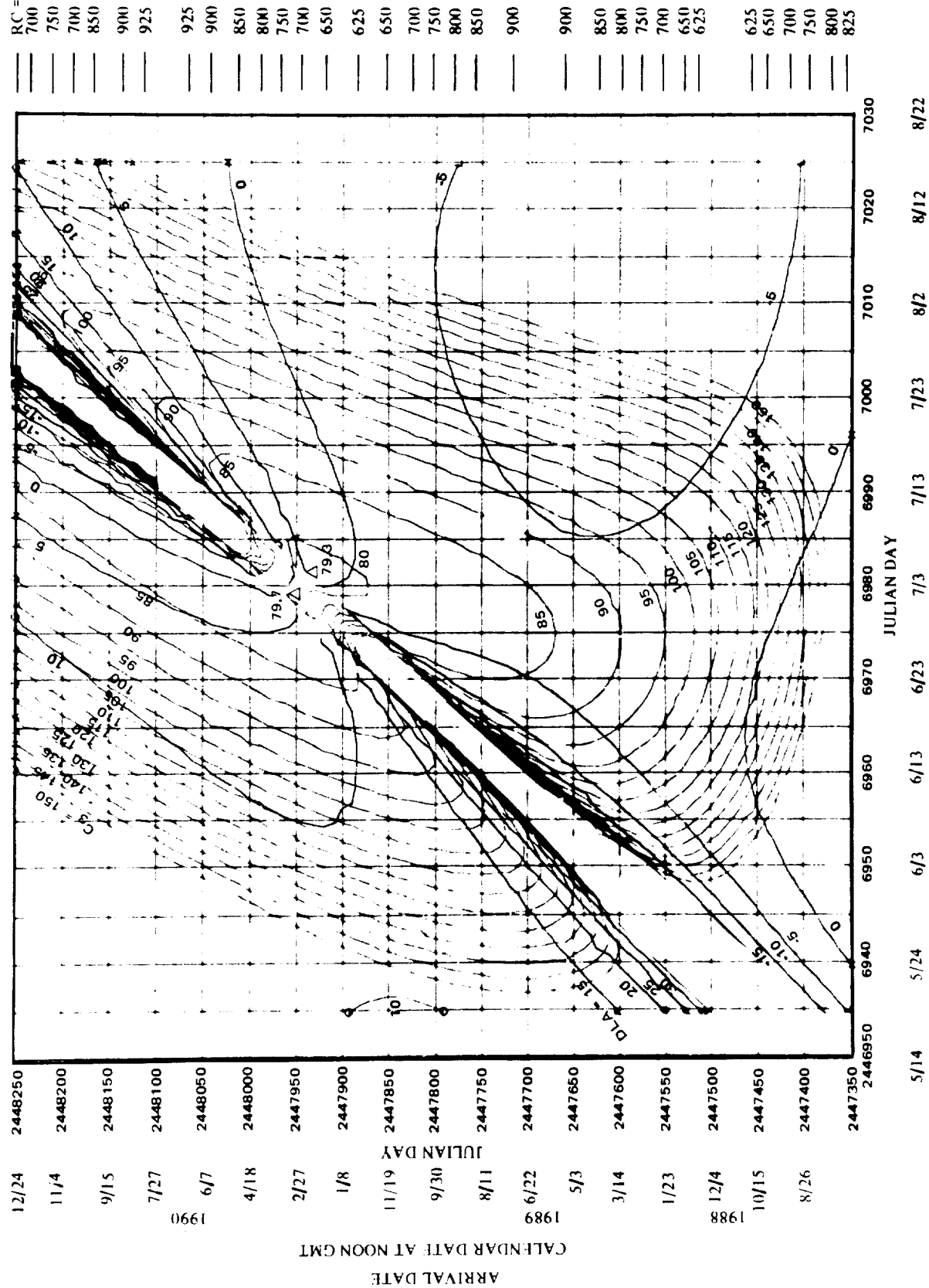
700  
750  
700  
850  
900  
925  
925  
900  
850  
800  
750  
700  
650  
625  
650  
700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
825



CONTOURS OF C<sub>3</sub> AND FLIGHT TIMES EARTH TO JUPITER 1987

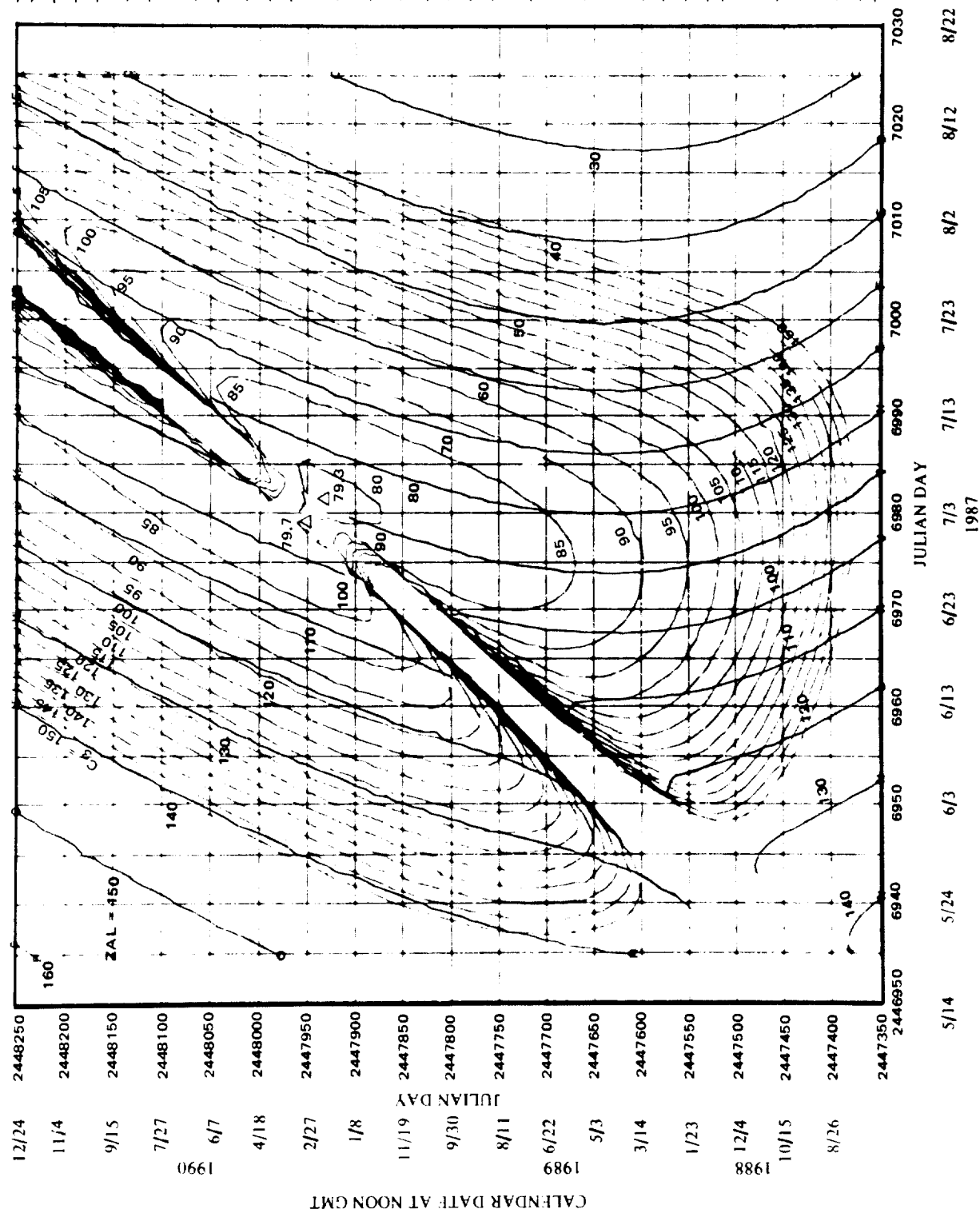


RC =  $675 \times 10^6$  km



RC =  $675 \times 10^6$  km

700 750 700 850 900 925 925 900 850 800 750 700 650 625 650 700 750 800 850 900 900 850 800 750 700 650 625 625 650 700 750 800 825



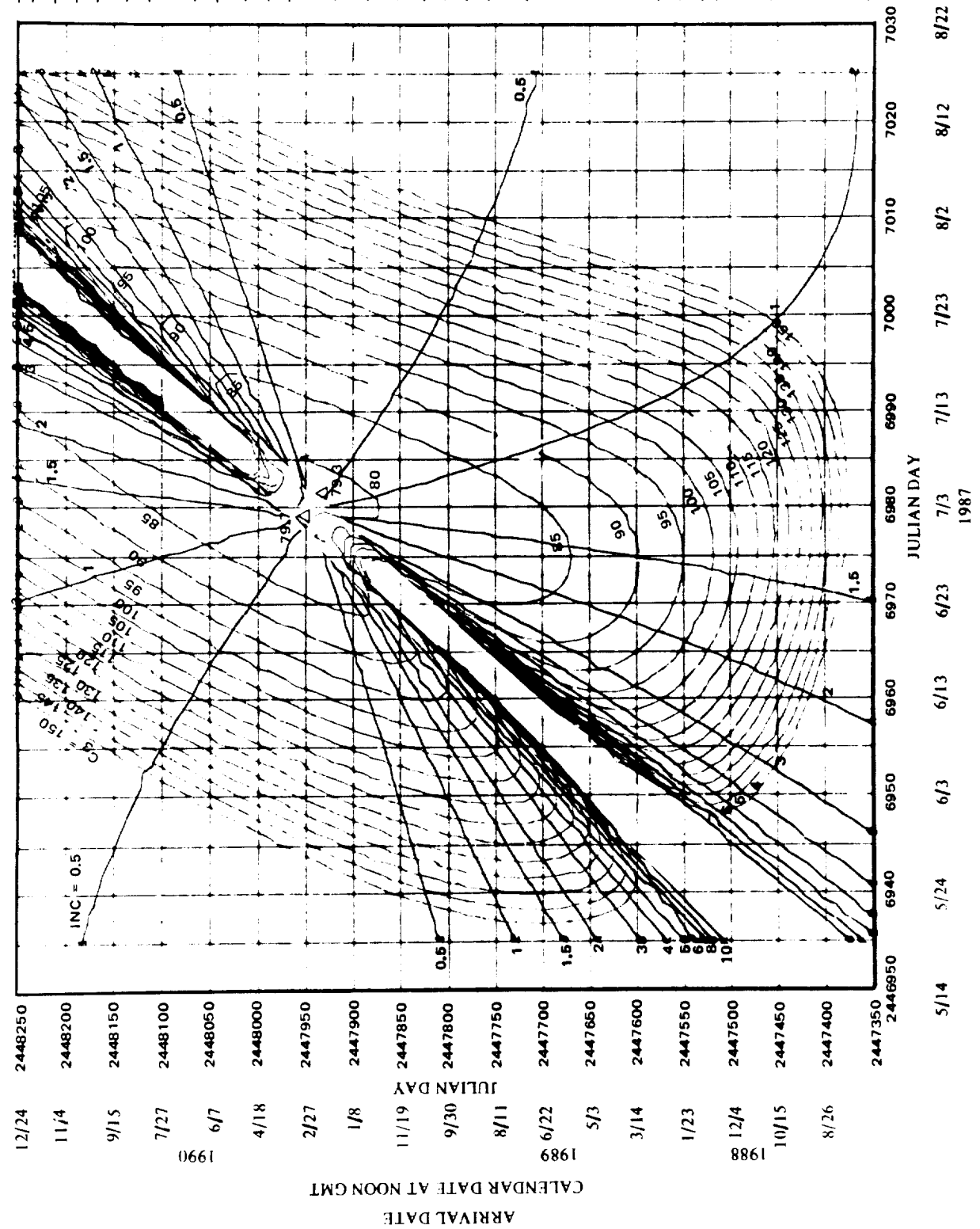
CALENDAR DATE AT NOON GMT

DEPARTURE DATE

CONTOURS OF  $C_3$  AND ZAL EARTH TO JUPITER 1987

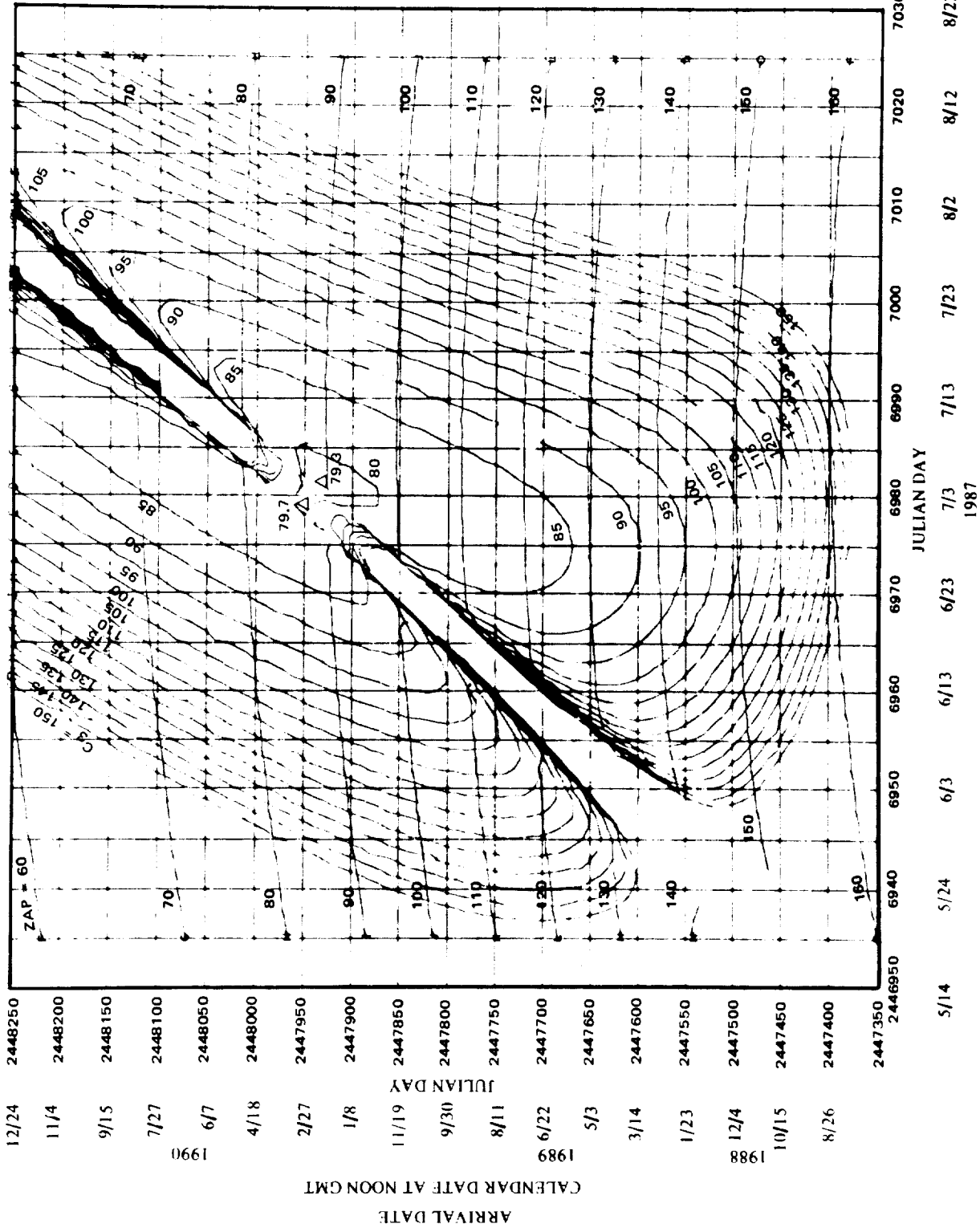
RC = 675 x 10<sup>6</sup> km

700  
750  
800  
850  
900  
925  
925  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
825



RC =  $675 \times 10^6$  km

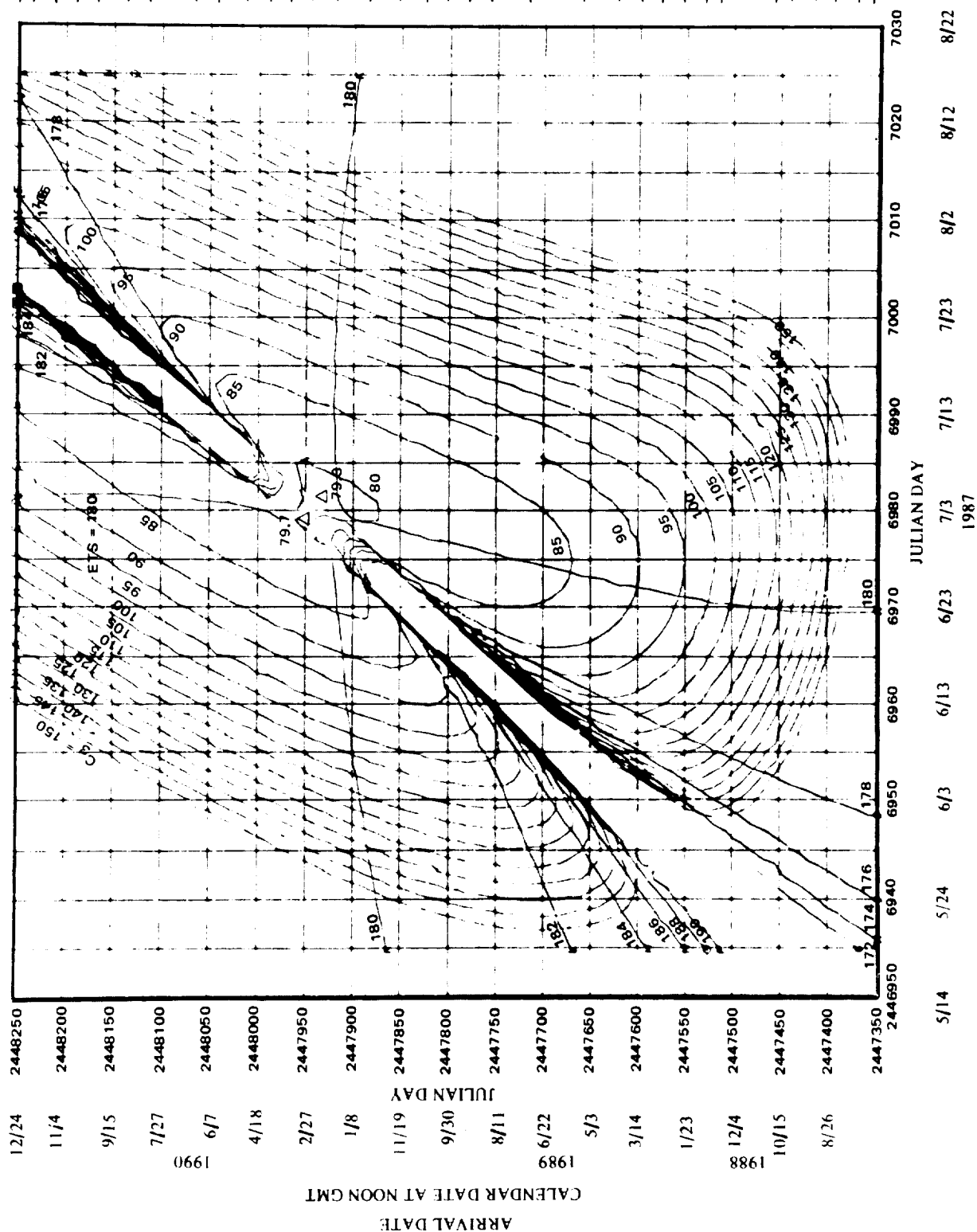
700  
750  
700  
850  
900  
925  
925  
900  
850  
800  
750  
700  
650  
625  
650  
700  
750  
800  
850  
900  
900  
850  
800  
750  
700  
650  
625  
625  
650  
700  
750  
800  
825



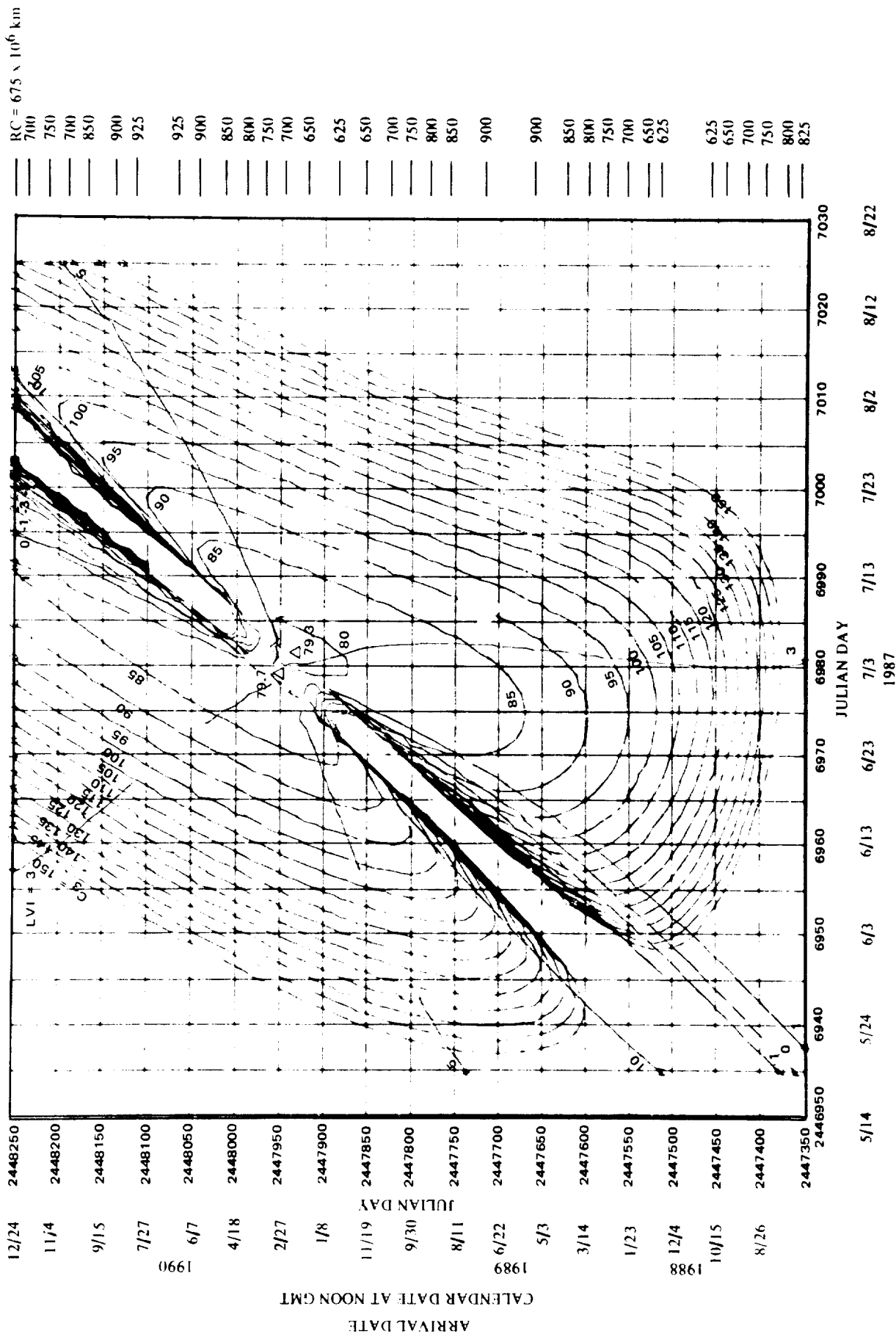
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE  
1987

CONTOURS OF  $C_3$  AND ZAP EARTH TO JUPITER 1987

RC =	700	750	700	850	900	925	925	900	850	800	750	700	650	625	650	700	750	800	850	900	900	850	800	750	700	650	625	800	825
------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

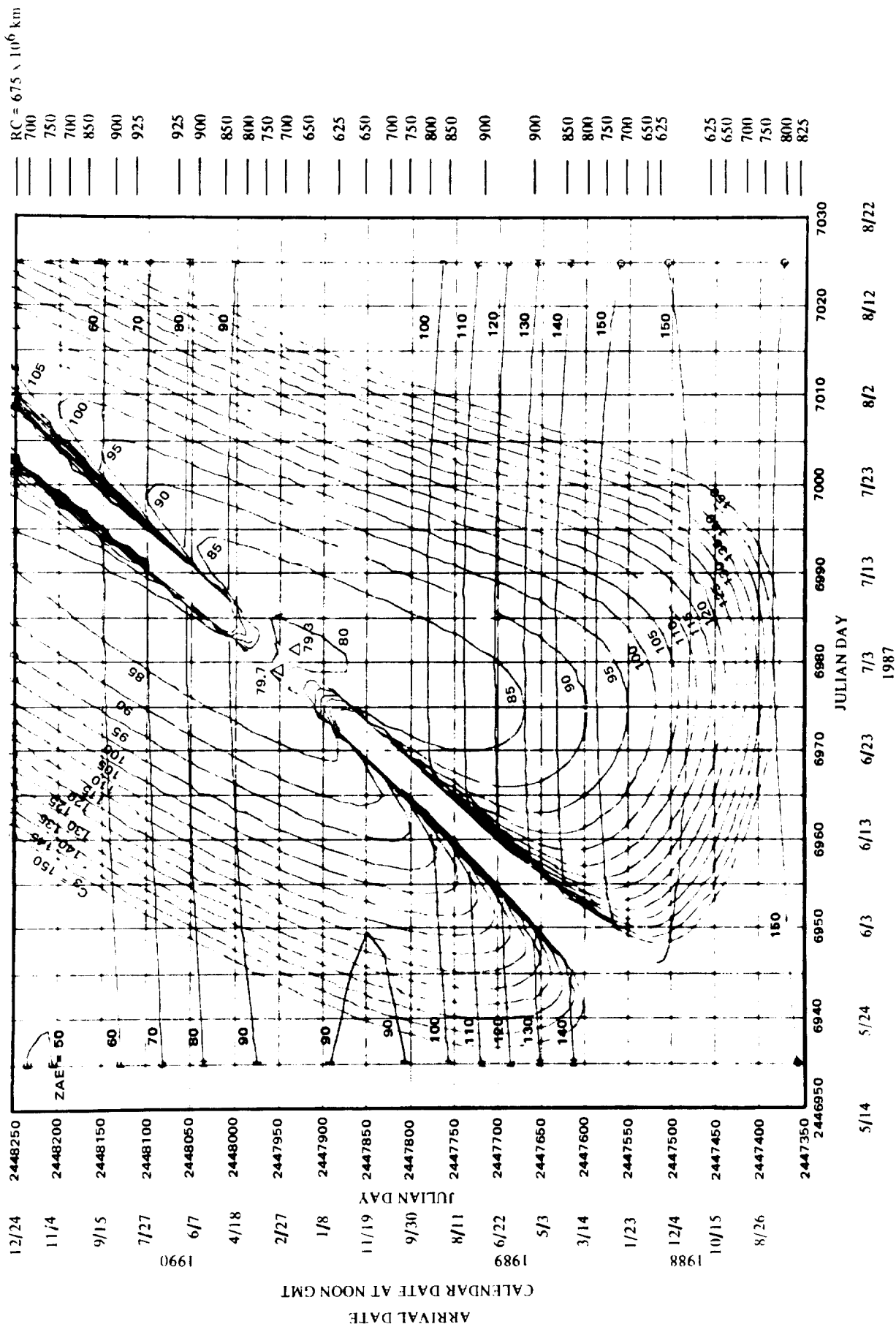
CONTOURS OF  $C_3$  AND ITS EARTH TO JUPITER 1987

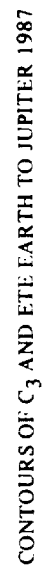
CALENDAR DATE AT NOON GMT	DEPARTURE DATE
1970-01-01	1970-01-01
1970-01-02	1970-01-02
1970-01-03	1970-01-03
1970-01-04	1970-01-04
1970-01-05	1970-01-05
1970-01-06	1970-01-06
1970-01-07	1970-01-07
1970-01-08	1970-01-08
1970-01-09	1970-01-09
1970-01-10	1970-01-10
1970-01-11	1970-01-11
1970-01-12	1970-01-12
1970-01-13	1970-01-13
1970-01-14	1970-01-14
1970-01-15	1970-01-15
1970-01-16	1970-01-16
1970-01-17	1970-01-17
1970-01-18	1970-01-18
1970-01-19	1970-01-19
1970-01-20	1970-01-20
1970-01-21	1970-01-21
1970-01-22	1970-01-22
1970-01-23	1970-01-23
1970-01-24	1970-01-24
1970-01-25	1970-01-25
1970-01-26	1970-01-26
1970-01-27	1970-01-27
1970-01-28	1970-01-28
1970-01-29	1970-01-29
1970-01-30	1970-01-30
1970-01-31	1970-01-31
1970-02-01	1970-02-01
1970-02-02	1970-02-02
1970-02-03	1970-02-03
1970-02-04	1970-02-04
1970-02-05	1970-02-05
1970-02-06	1970-02-06
1970-02-07	1970-02-07
1970-02-08	1970-02-08
1970-02-09	1970-02-09
1970-02-10	1970-02-10
1970-02-11	1970-02-11
1970-02-12	1970-02-12
1970-02-13	1970-02-13
1970-02-14	1970-02-14
1970-02-15	1970-02-15
1970-02-16	1970-02-16
1970-02-17	1970-02-17
1970-02-18	1970-02-18
1970-02-19	1970-02-19
1970-02-20	1970-02-20
1970-02-21	1970-02-21
1970-02-22	1970-02-22
1970-02-23	1970-02-23
1970-02-24	1970-02-24
1970-02-25	1970-02-25
1970-02-26	1970-02-26
1970-02-27	1970-02-27
1970-02-28	1970-02-28
1970-03-01	1970-03-01
1970-03-02	1970-03-02
1970-03-03	1970-03-03
1970-03-04	1970-03-04
1970-03-05	1970-03-05
1970-03-06	1970-03-06
1970-03-07	1970-03-07
1970-03-08	1970-03-08
1970-03-09	1970-03-09
1970-03-10	1970-03-10
1970-03-11	1970-03-11
1970-03-12	1970-03-12
1970-03-13	1970-03-13
1970-03-14	1970-03-14
1970-03-15	1970-03-15
1970-03-16	1970-03-16
1970-03-17	1970-03-17
1970-03-18	1970-03-18
1970-03-19	1970-03-19
1970-03-20	1970-03-20
1970-03-21	1970-03-21
1970-03-22	1970-03-22
1970-03-23	1970-03-23
1970-03-24	1970-03-24
1970-03-25	1970-03-25
1970-03-26	1970-03-26
1970-03-27	1970-03-27
1970-03-28	1970-03-28
1970-03-29	1970-03-29
1970-03-30	1970-03-30
1970-03-31	1970-03-31
1970-04-01	1970-04-01
1970-04-02	1970-04-02
1970-04-03	1970-04-03
1970-04-04	1970-04-04
1970-04-05	1970-04-05
1970-04-06	1970-04-06
1970-04-07	1970-04-07
1970-04-08	1970-04-08
1970-04-09	1970-04-09
1970-04-10	1970-04-10
1970-04-11	1970-04-11
1970-04-12	1970-04-12
1970-04-13	1970-04-13
1970-04-14	1970-04-14

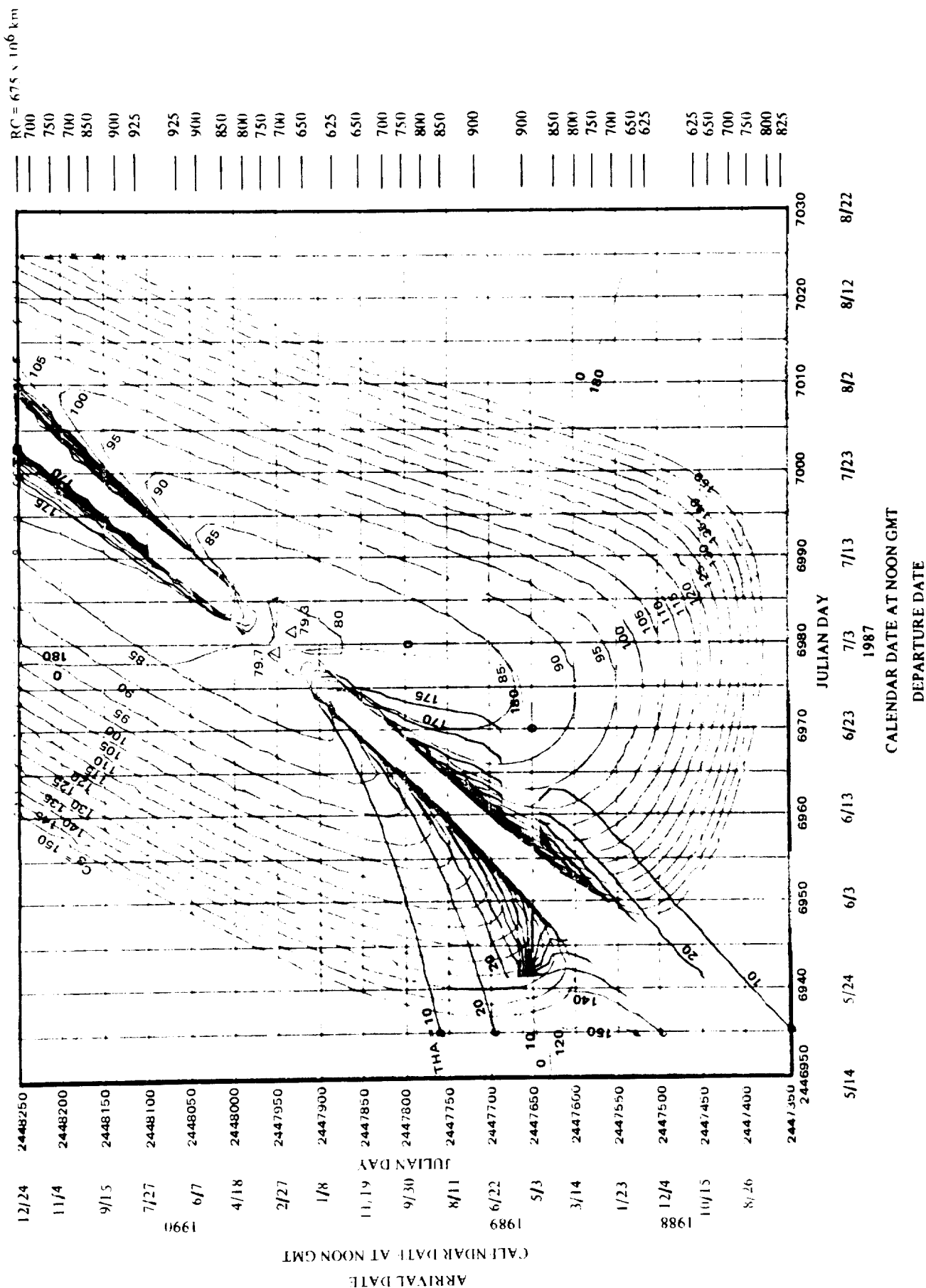


CONTOURS OF  $C_3$  AND LVI EARTH TO JUPITER 1987



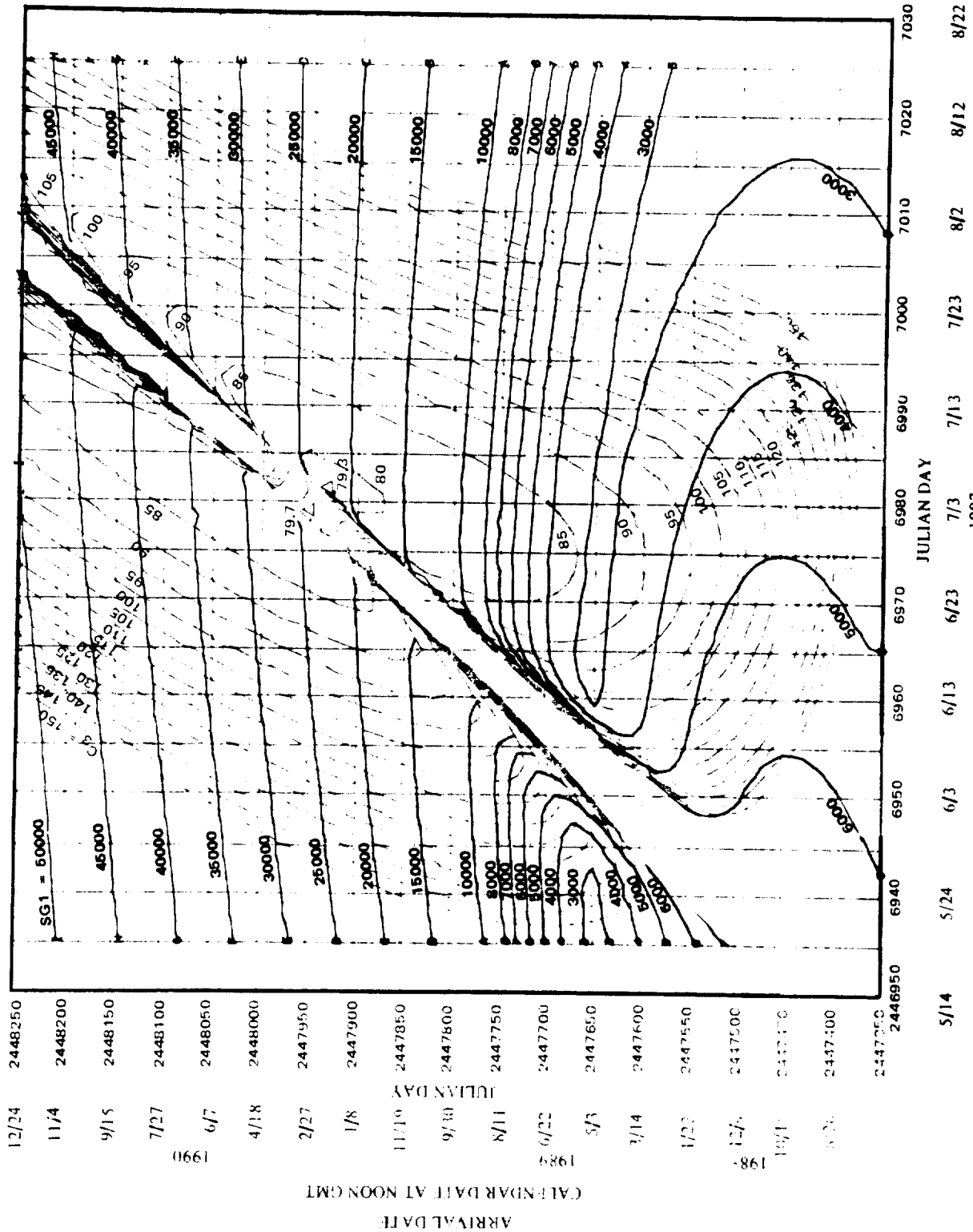
CONTOURS OF  $C_3$  AND ZAE EARTH TO JUPITER 1987





CONTOURS OF  $C_3$  AND THE EARTH TO JUPITER 1987

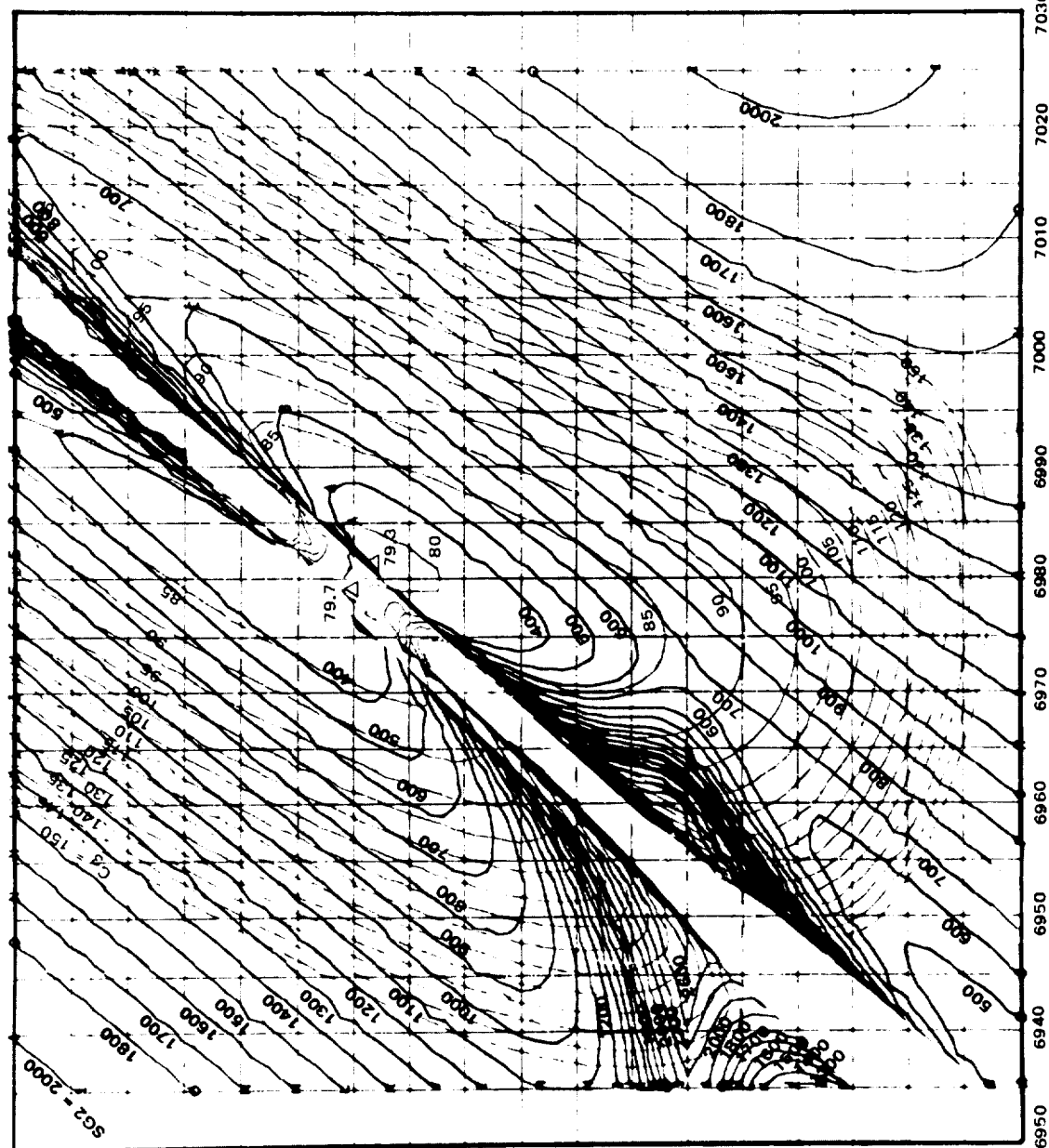
RC	7000	7500	7000	8500	9000	9250	9250	9000	8500	8000	7500	7000	6500	6250	6500	7000	7500	8000	8500	9000	9000	8500	8000	7500	7000	6500	6250	6250	6500	7000	7500	8000	8250
----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

CONTOURS OF  $C_3$  AND SGI EARTH TO JUPITER 1987

CALENDAR DATE AT NOON GMT	DEPARTURE DATE
1970-01-01	1970-01-01
1970-01-02	1970-01-02
1970-01-03	1970-01-03
1970-01-04	1970-01-04
1970-01-05	1970-01-05
1970-01-06	1970-01-06
1970-01-07	1970-01-07
1970-01-08	1970-01-08
1970-01-09	1970-01-09
1970-01-10	1970-01-10
1970-01-11	1970-01-11
1970-01-12	1970-01-12
1970-01-13	1970-01-13
1970-01-14	1970-01-14
1970-01-15	1970-01-15
1970-01-16	1970-01-16
1970-01-17	1970-01-17
1970-01-18	1970-01-18
1970-01-19	1970-01-19
1970-01-20	1970-01-20
1970-01-21	1970-01-21
1970-01-22	1970-01-22
1970-01-23	1970-01-23
1970-01-24	1970-01-24
1970-01-25	1970-01-25
1970-01-26	1970-01-26
1970-01-27	1970-01-27
1970-01-28	1970-01-28
1970-01-29	1970-01-29
1970-01-30	1970-01-30
1970-01-31	1970-01-31
1970-02-01	1970-02-01
1970-02-02	1970-02-02
1970-02-03	1970-02-03
1970-02-04	1970-02-04
1970-02-05	1970-02-05
1970-02-06	1970-02-06
1970-02-07	1970-02-07
1970-02-08	1970-02-08
1970-02-09	1970-02-09
1970-02-10	1970-02-10
1970-02-11	1970-02-11
1970-02-12	1970-02-12
1970-02-13	1970-02-13
1970-02-14	1970-02-14
1970-02-15	1970-02-15
1970-02-16	1970-02-16
1970-02-17	1970-02-17
1970-02-18	1970-02-18
1970-02-19	1970-02-19
1970-02-20	1970-02-20
1970-02-21	1970-02-21
1970-02-22	1970-02-22
1970-02-23	1970-02-23
1970-02-24	1970-02-24
1970-02-25	1970-02-25
1970-02-26	1970-02-26
1970-02-27	1970-02-27
1970-02-28	1970-02-28
1970-03-01	1970-03-01
1970-03-02	1970-03-02
1970-03-03	1970-03-03
1970-03-04	1970-03-04
1970-03-05	1970-03-05
1970-03-06	1970-03-06
1970-03-07	1970-03-07
1970-03-08	1970-03-08
1970-03-09	1970-03-09
1970-03-10	1970-03-10
1970-03-11	1970-03-11
1970-03-12	1970-03-12
1970-03-13	1970-03-13
1970-03-14	1970-03-14
1970-03-15	1970-03-15
1970-03-16	1970-03-16
1970-03-17	1970-03-17
1970-03-18	1970-03-18
1970-03-19	1970-03-19
1970-03-20	1970-03-20
1970-03-21	1970-03-21
1970-03-22	1970-03-22
1970-03-23	1970-03-23
1970-03-24	1970-03-24
1970-03-25	1970-03-25
1970-03-26	1970-03-26
1970-03-27	1970-03-27
1970-03-28	1970-03-28
1970-03-29	1970-03-29
1970-03-30	1970-03-30
1970-03-31	1970-03-31
1970-04-01	1970-04-01
1970-04-02	1970-04-02
1970-04-03	1970-04-03
1970-04-04	1970-04-04
1970-04-05	1970-04-05
1970-04-06	1970-04-06
1970-04-07	1970-04-07
1970-04-08	1970-04-08
1970-04-09	1970-04-09
1970-04-10	1970-04-10
1970-04-11	1970-04-11
1970-04-12	1970-04-12
1970-04-13	1970-04-13
1970-04-14	1970-04-14

RC =  $67.5 \times 10^6$  km

7000 7500 7000 8500 9000 9250 9250 9000 8500 8000 7500 7000 6500 6250 6500 7000 7500 8000 8500 9000 9000 8500 8000 7500 7000 6500 6250 6250 6500 7000 7500 8000 8250

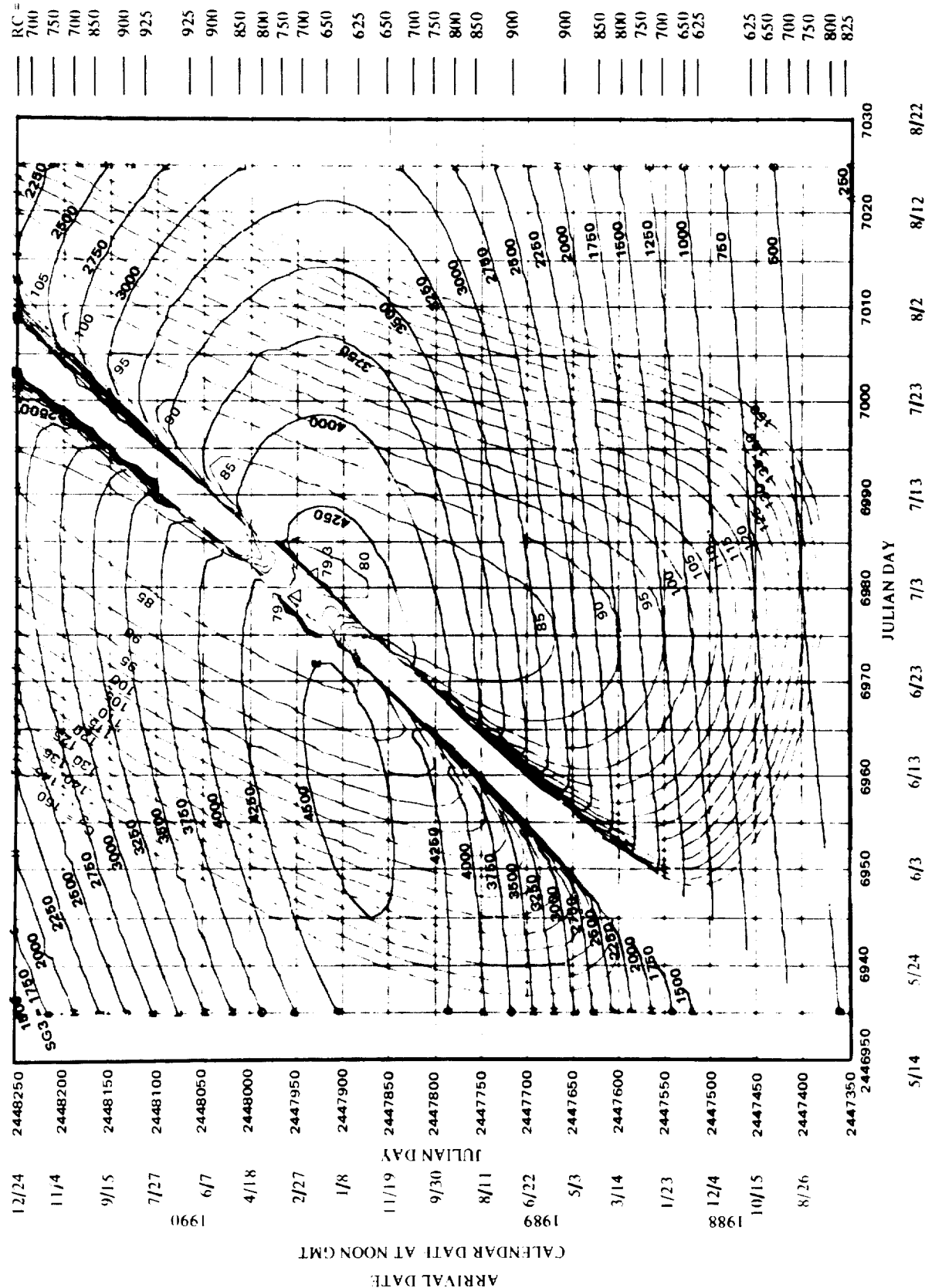


JULIAN DAY

CALENDAR DATE AT NOON GMT  
1987

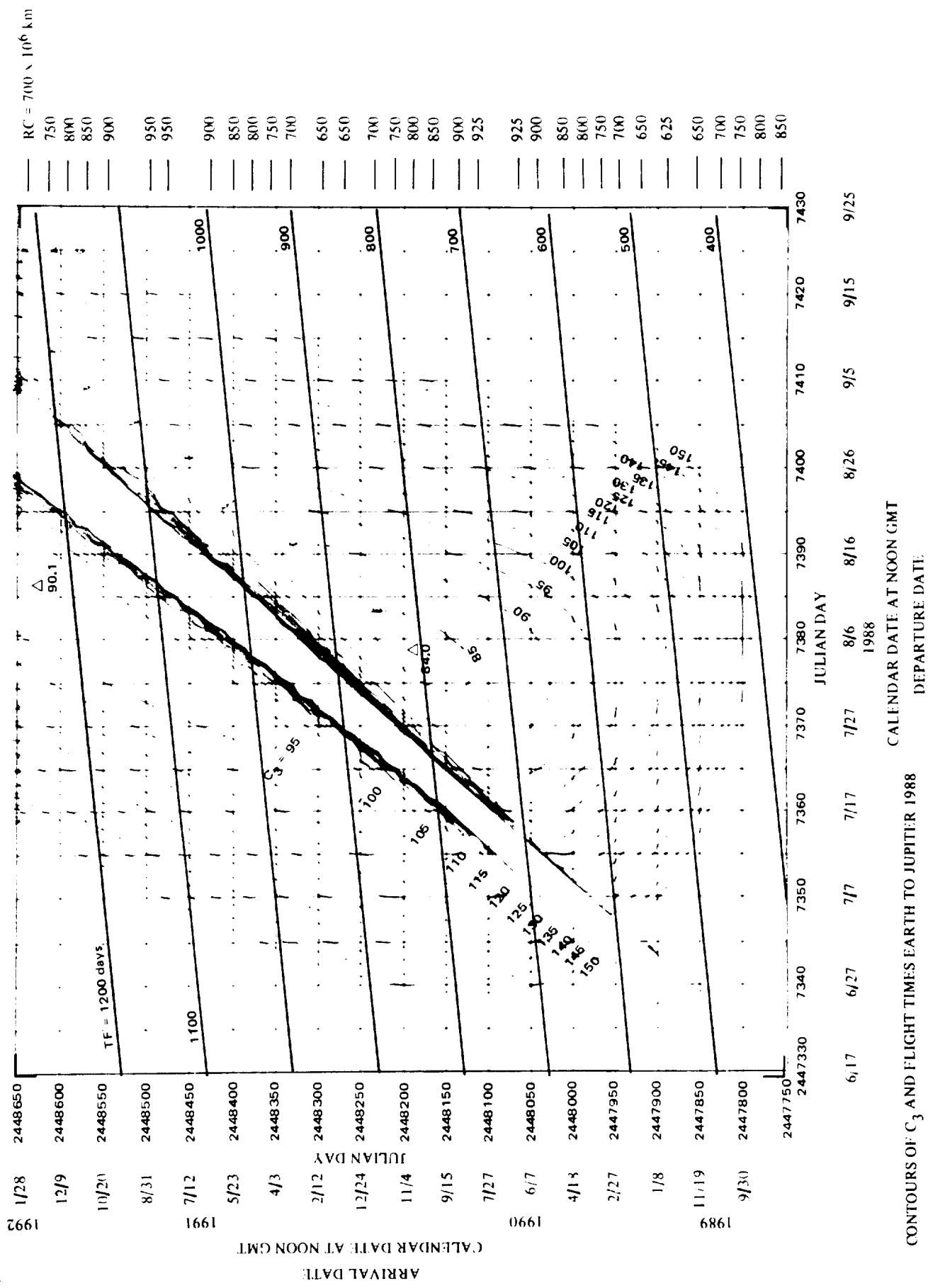
DEPARTURE DATE

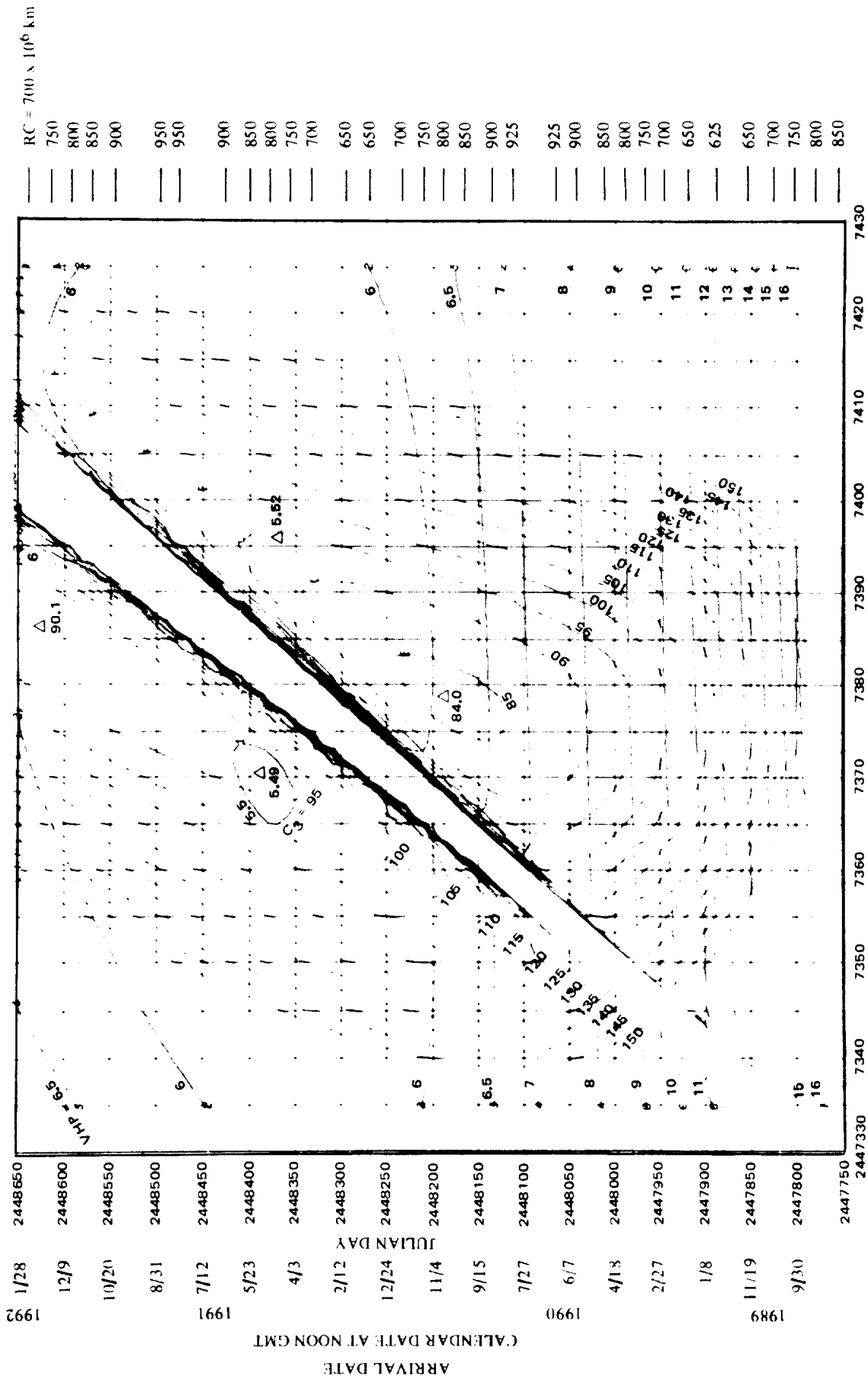
CONTOURS OF  $C_3$  AND SG2 EARTH TO JUPITER 1987



CALENDAR DATE AT NOON GMT	DEPARTURE DATE
1970-01-01	1970-01-01
1970-01-02	1970-01-02
1970-01-03	1970-01-03
1970-01-04	1970-01-04
1970-01-05	1970-01-05
1970-01-06	1970-01-06
1970-01-07	1970-01-07
1970-01-08	1970-01-08
1970-01-09	1970-01-09
1970-01-10	1970-01-10
1970-01-11	1970-01-11
1970-01-12	1970-01-12
1970-01-13	1970-01-13
1970-01-14	1970-01-14
1970-01-15	1970-01-15
1970-01-16	1970-01-16
1970-01-17	1970-01-17
1970-01-18	1970-01-18
1970-01-19	1970-01-19
1970-01-20	1970-01-20
1970-01-21	1970-01-21
1970-01-22	1970-01-22
1970-01-23	1970-01-23
1970-01-24	1970-01-24
1970-01-25	1970-01-25
1970-01-26	1970-01-26
1970-01-27	1970-01-27
1970-01-28	1970-01-28
1970-01-29	1970-01-29
1970-01-30	1970-01-30
1970-01-31	1970-01-31
1970-02-01	1970-02-01
1970-02-02	1970-02-02
1970-02-03	1970-02-03
1970-02-04	1970-02-04
1970-02-05	1970-02-05
1970-02-06	1970-02-06
1970-02-07	1970-02-07
1970-02-08	1970-02-08
1970-02-09	1970-02-09
1970-02-10	1970-02-10
1970-02-11	1970-02-11
1970-02-12	1970-02-12
1970-02-13	1970-02-13
1970-02-14	1970-02-14
1970-02-15	1970-02-15
1970-02-16	1970-02-16
1970-02-17	1970-02-17
1970-02-18	1970-02-18
1970-02-19	1970-02-19
1970-02-20	1970-02-20
1970-02-21	1970-02-21
1970-02-22	1970-02-22
1970-02-23	1970-02-23
1970-02-24	1970-02-24
1970-02-25	1970-02-25
1970-02-26	1970-02-26
1970-02-27	1970-02-27
1970-02-28	1970-02-28
1970-03-01	1970-03-01
1970-03-02	1970-03-02
1970-03-03	1970-03-03
1970-03-04	1970-03-04
1970-03-05	1970-03-05
1970-03-06	1970-03-06
1970-03-07	1970-03-07
1970-03-08	1970-03-08
1970-03-09	1970-03-09
1970-03-10	1970-03-10
1970-03-11	1970-03-11
1970-03-12	1970-03-12
1970-03-13	1970-03-13
1970-03-14	1970-03-14
1970-03-15	1970-03-15
1970-03-16	1970-03-16
1970-03-17	1970-03-17
1970-03-18	1970-03-18
1970-03-19	1970-03-19
1970-03-20	1970-03-20
1970-03-21	1970-03-21
1970-03-22	1970-03-22
1970-03-23	1970-03-23
1970-03-24	1970-03-24
1970-03-25	1970-03-25
1970-03-26	1970-03-26
1970-03-27	1970-03-27
1970-03-28	1970-03-28
1970-03-29	1970-03-29
1970-03-30	1970-03-30
1970-03-31	1970-03-31
1970-04-01	1970-04-01
1970-04-02	1970-04-02
1970-04-03	1970-04-03
1970-04-04	1970-04-04
1970-04-05	1970-04-05
1970-04-06	1970-04-06
1970-04-07	1970-04-07
1970-04-08	1970-04-08
1970-04-09	1970-04-09
1970-04-10	1970-04-10
1970-04-11	1970-04-11
1970-04-12	1970-04-12
1970-04-13	1970-04-13
1970-04-14	1970-04-14

CONTOURS OF  $C_3$  AND SG3 EARTH TO JUPITER 1987





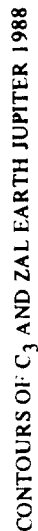
CALENDAR DATE AT NOON GMT  
 JULIAN DAY

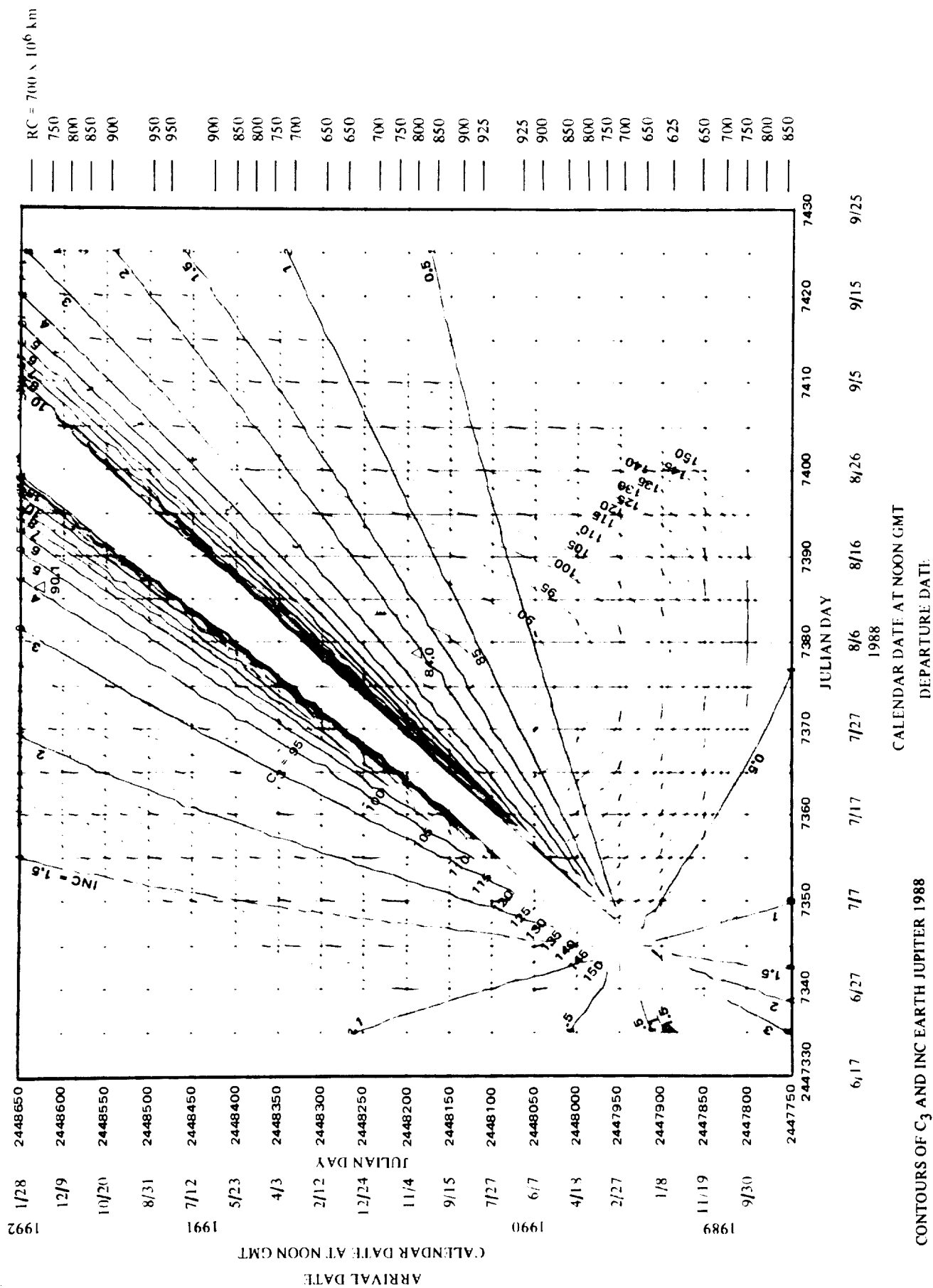
CALENDAR DATE AT NOON GMT  
 DEPARTURE DATE

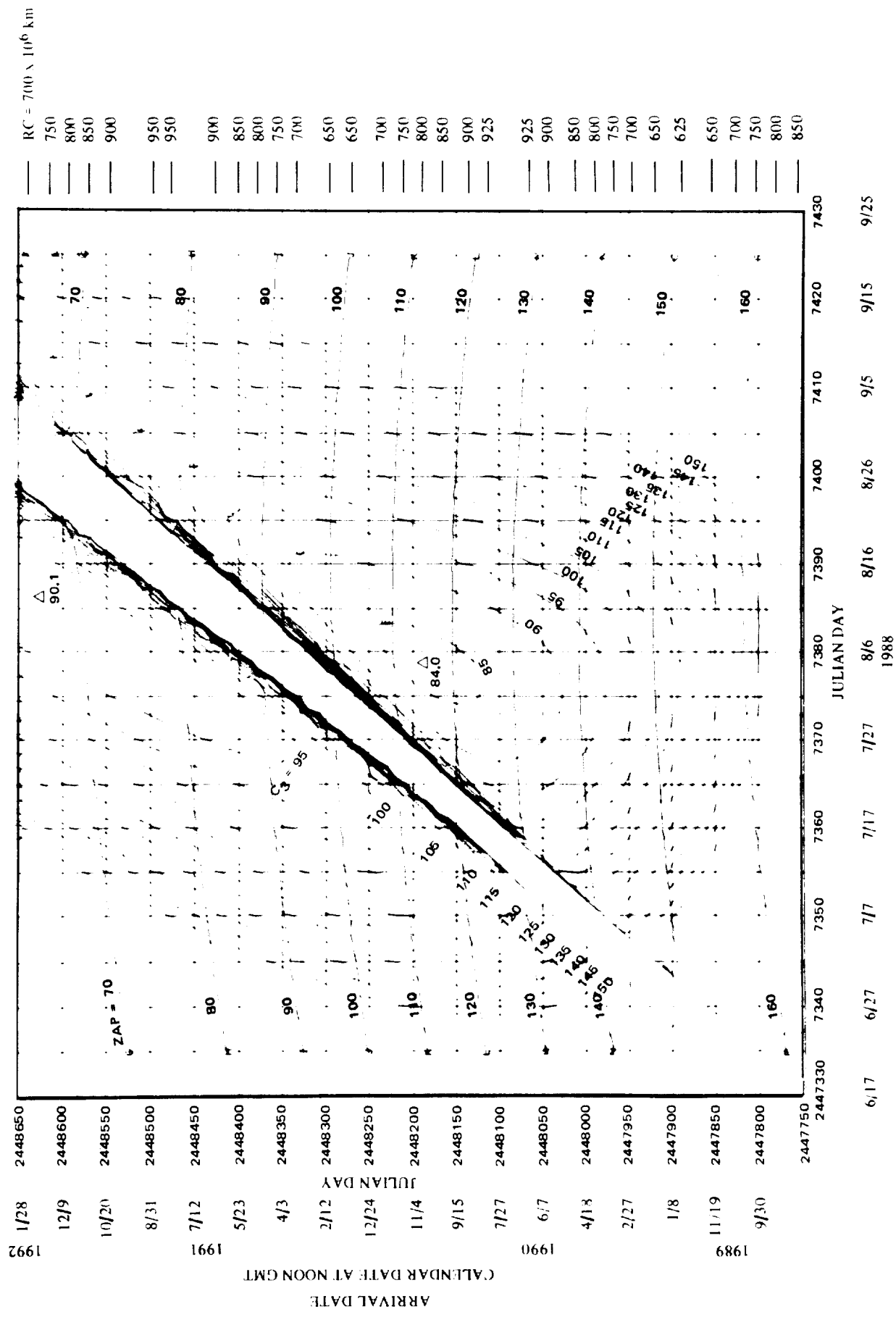
CONTOURS OF  $C_3$  AND VHF EARTH JUPITER 1988







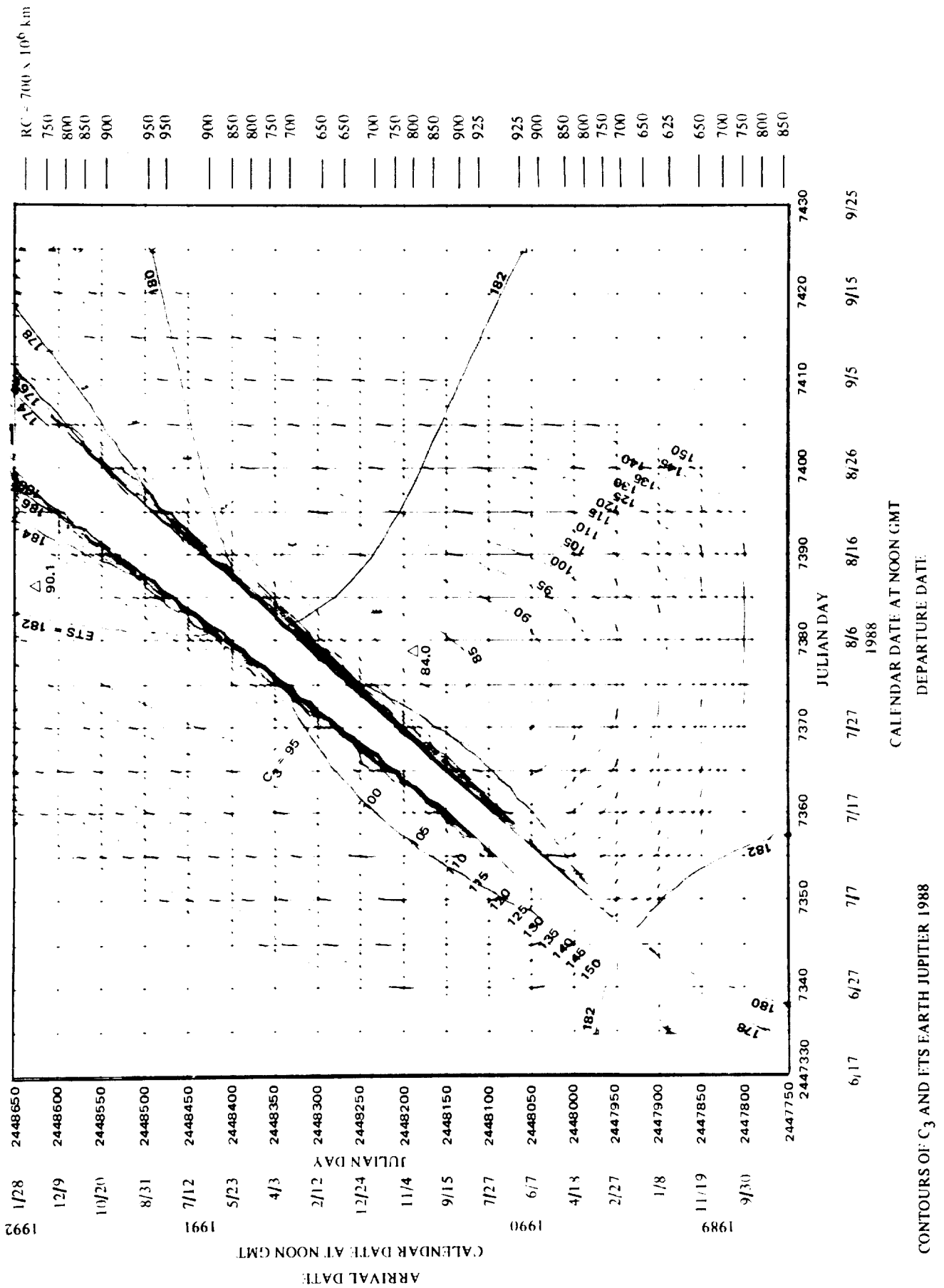


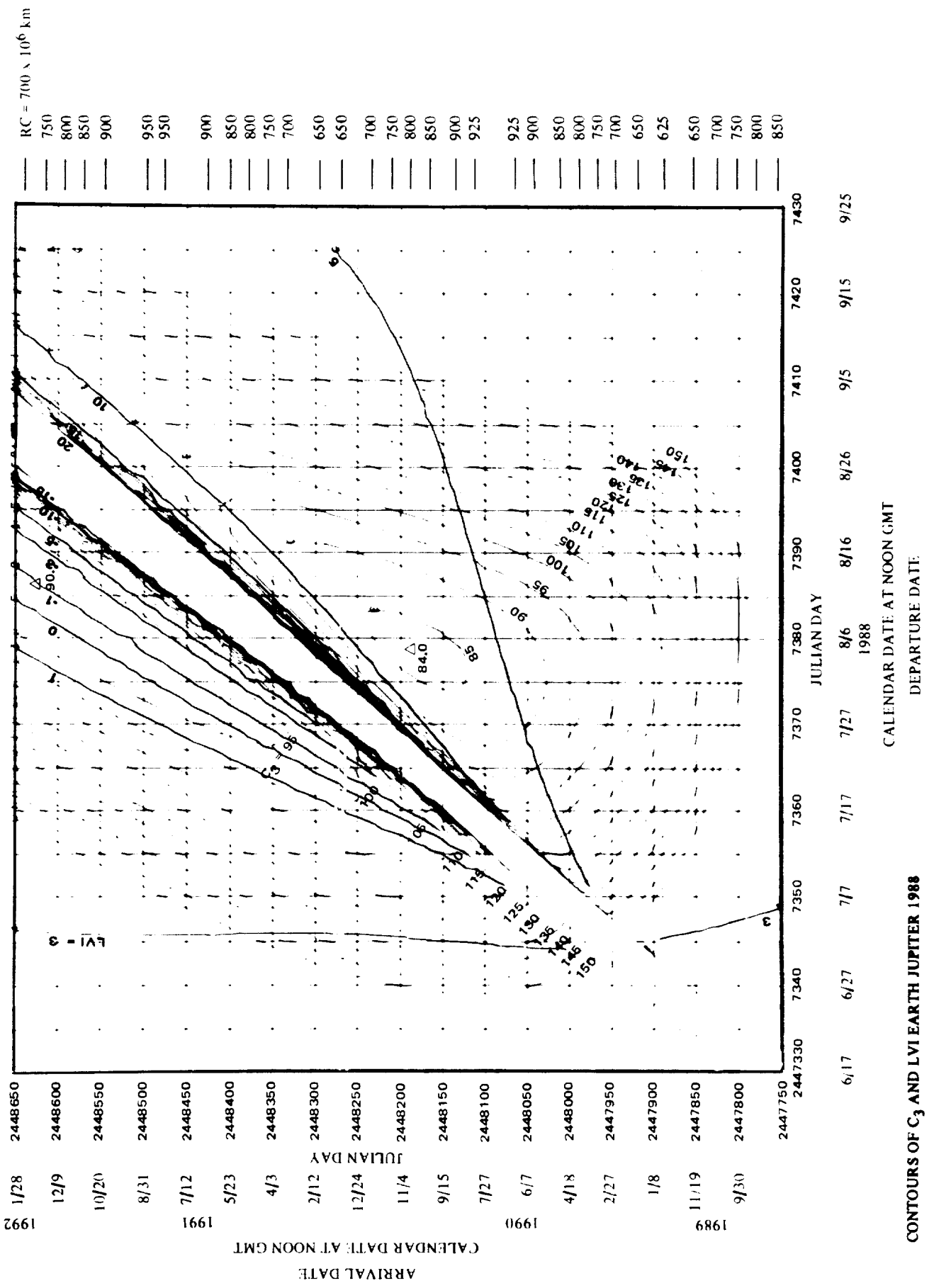


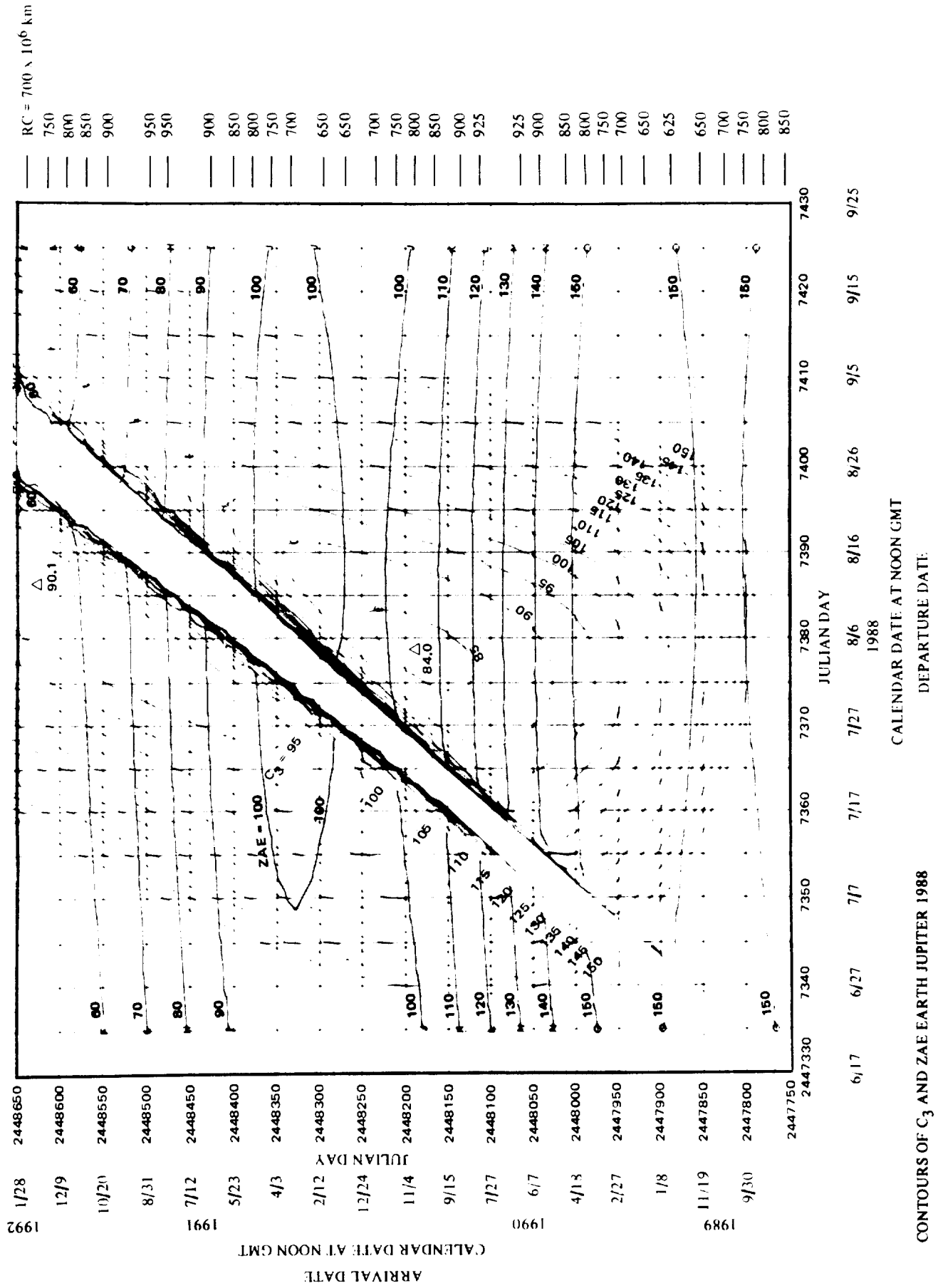
CONTOURS OF  $C_3$  AND ZAP EARTH JUPITER 1988

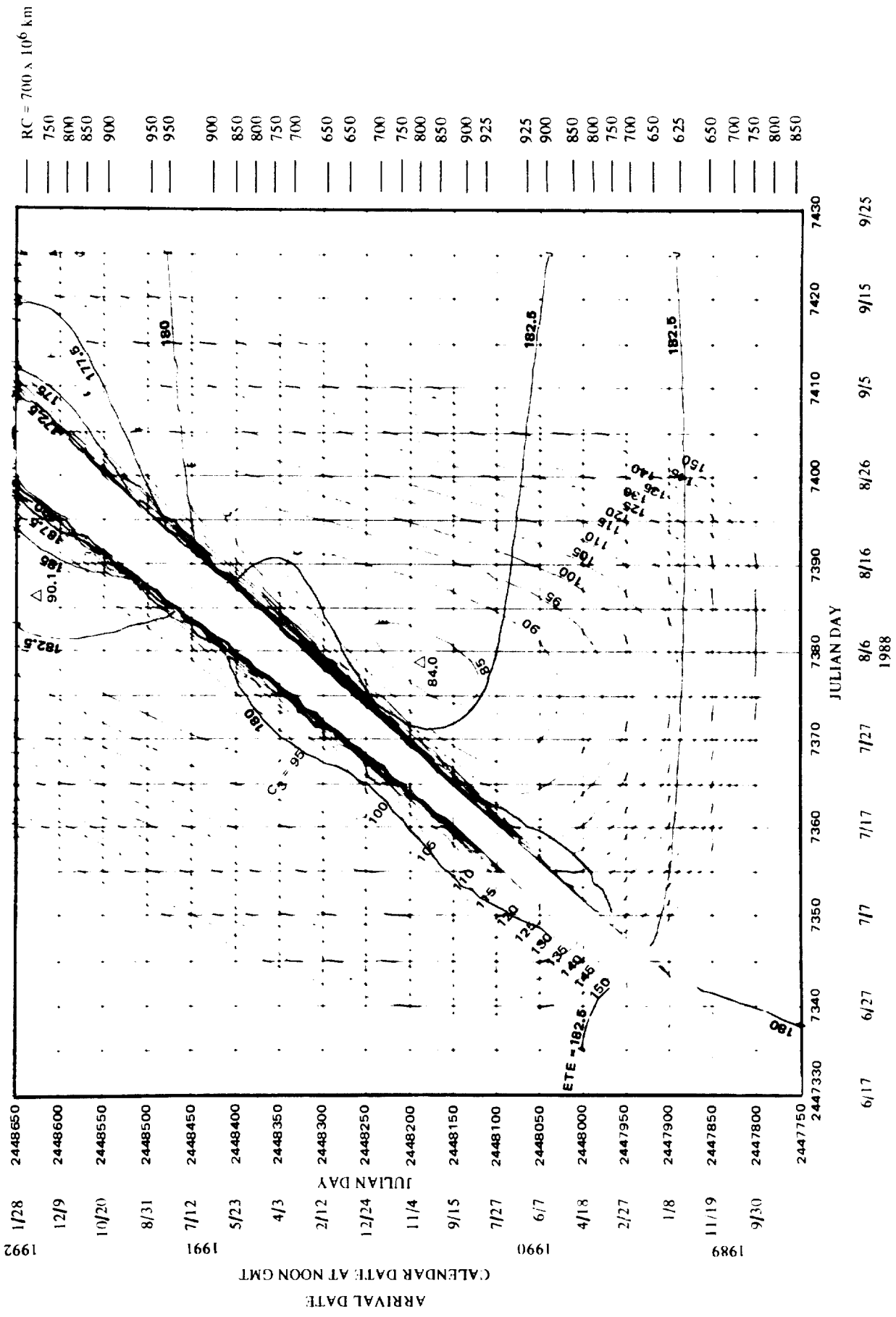
CALENDAR DATE AT NOON GMT

DEPARTURE DATE







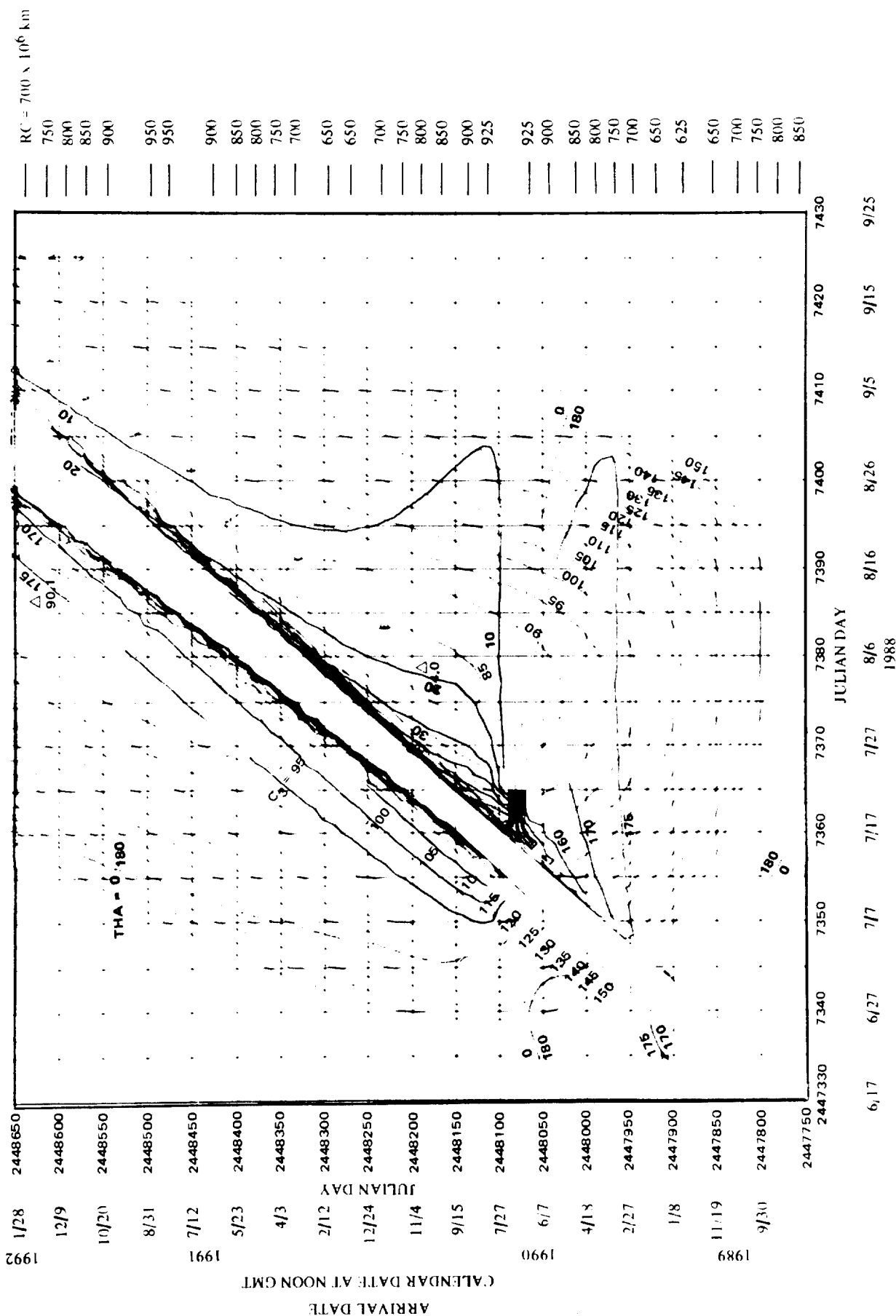


CONTOURS OF C<sub>3</sub> AND ETE EARTH JUPITER 1988

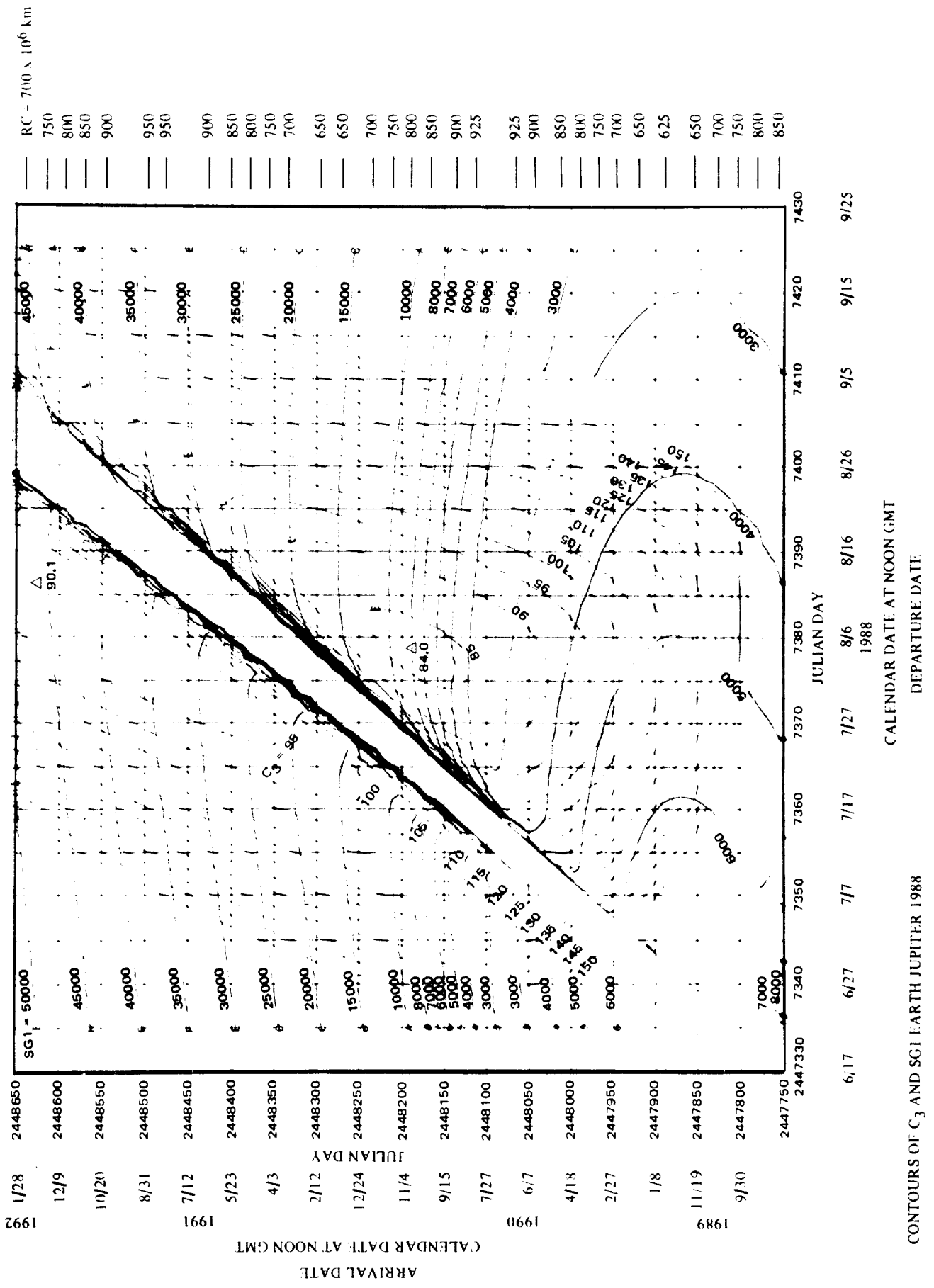
CALENDAR DATE AT NOON GMT

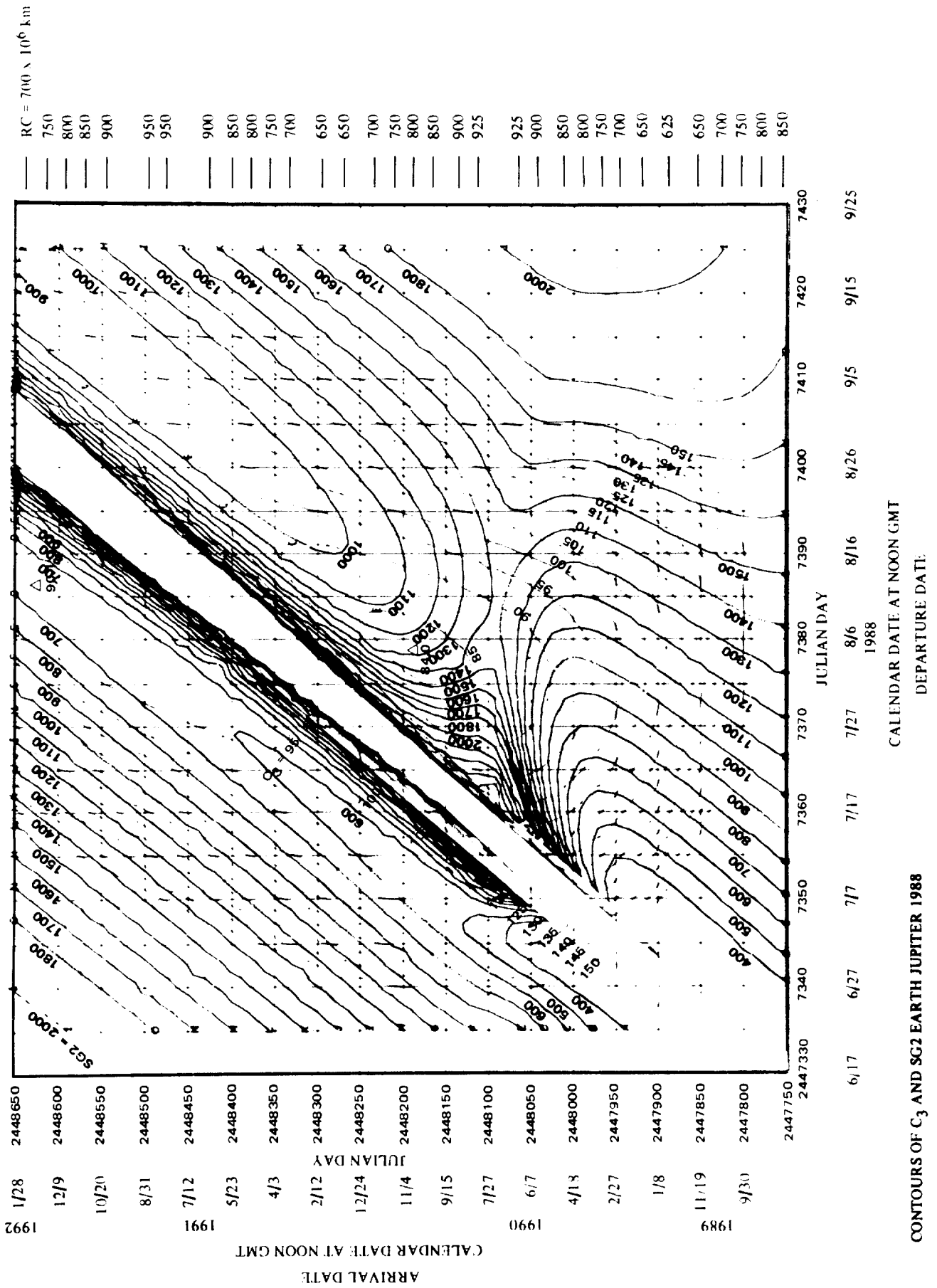
DEPARTURE DATE

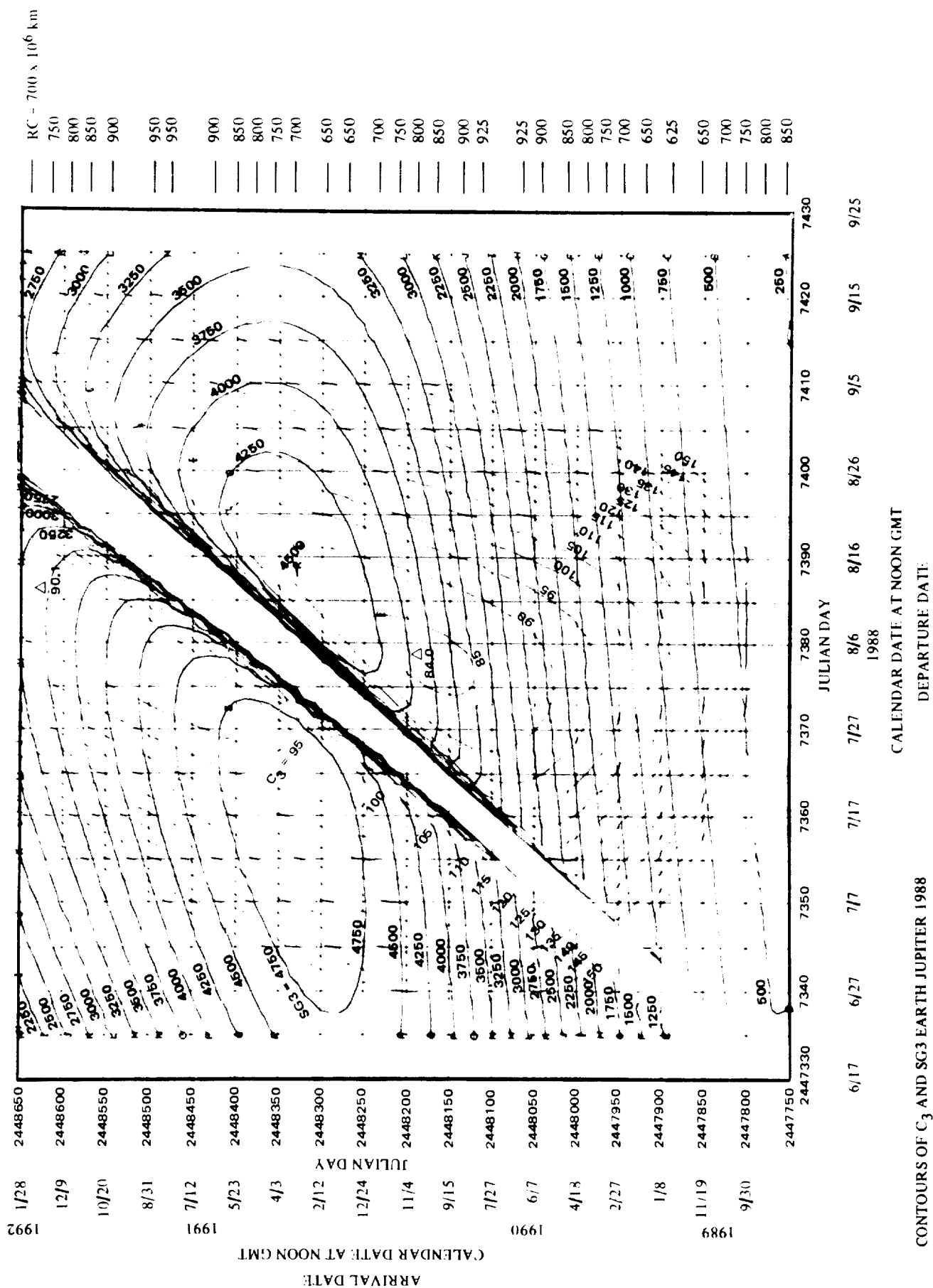




CONTOURS OF C<sub>3</sub> AND THA EARTH JUPITER 1988





CONTOURS OF C<sub>3</sub> AND SG3 EARTH JUPITER 1988

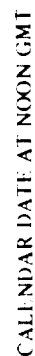
CALENDAR DATE AT NOON GMT

DEPARTURE DATE:

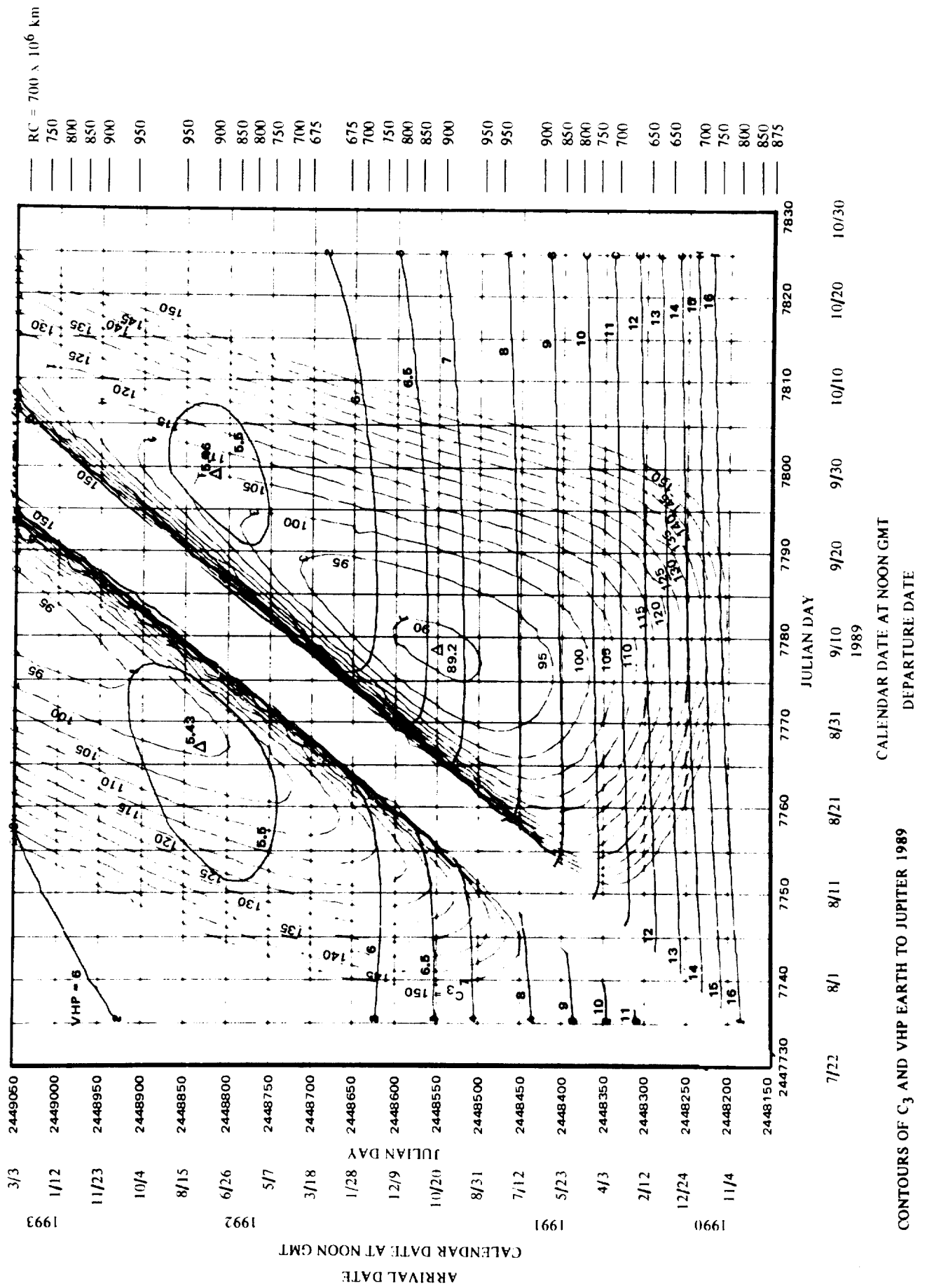
ARRIVAL DATE	CALENDAR DATE AT NOON GMT
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1944-01-02	1944-01-02
1944-01-03	1944-01-03
1944-01-04	1944-01-04
1944-01-05	1944-01-05
1944-01-06	1944-01-06
1944-01-07	1944-01-07
1944-01-08	1944-01-08
1944-01-09	1944-01-09
1944-01-10	1944-01-10
1944-01-11	1944-01-11
1944-01-12	1944-01-12
1944-01-13	1944-01-13
1944-01-14	1944-01-14
1944-01-15	1944-01-15
1944-01-16	1944-01-16
1944-01-17	1944-01-17
1944-01-18	1944-01-18
1944-01-19	1944-01-19
1944-01-20	1944-01-20
1944-01-21	1944-01-21
1944-01-22	1944-01-22
1944-01-23	1944-01-23
1944-01-24	1944-01-24
1944-01-25	1944-01-25
1944-01-26	1944-01-26
1944-01-27	1944-01-27
1944-01-28	1944-01-28
1944-01-29	1944-01-29
1944-01-30	1944-01-30
1944-01-31	1944-01-31

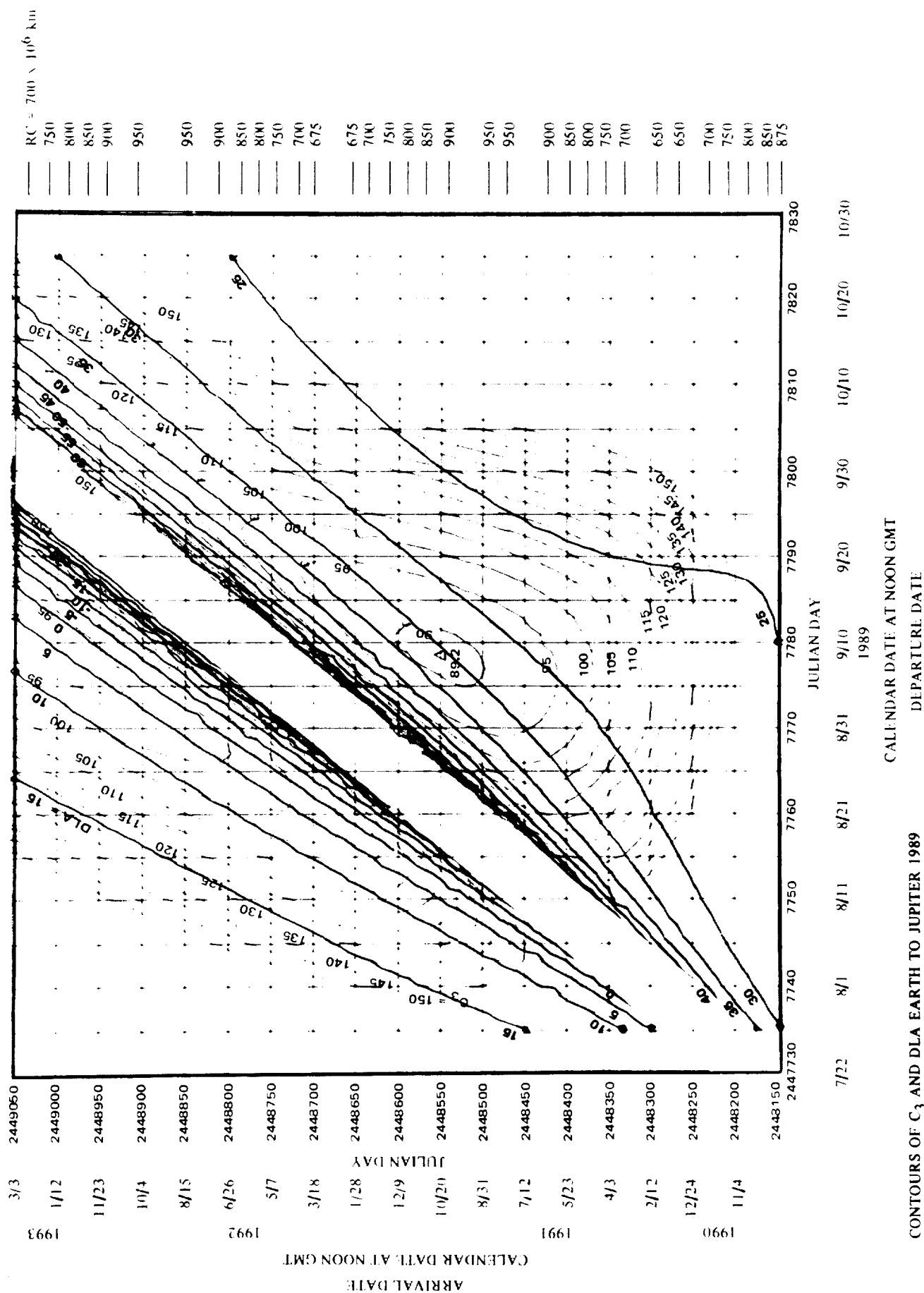
4-154

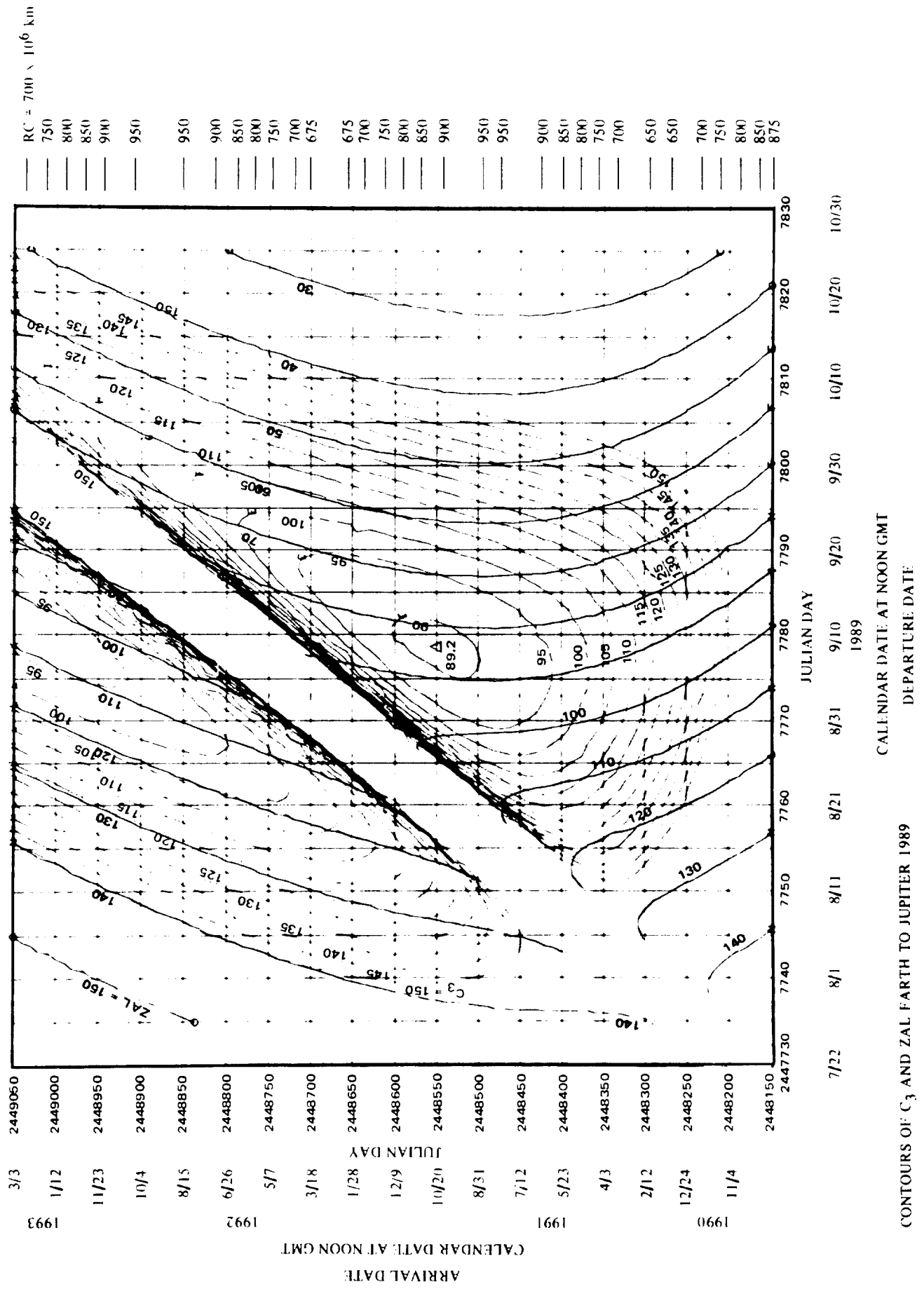
$$RC^* = 700 \times 10^6 \text{ km}$$



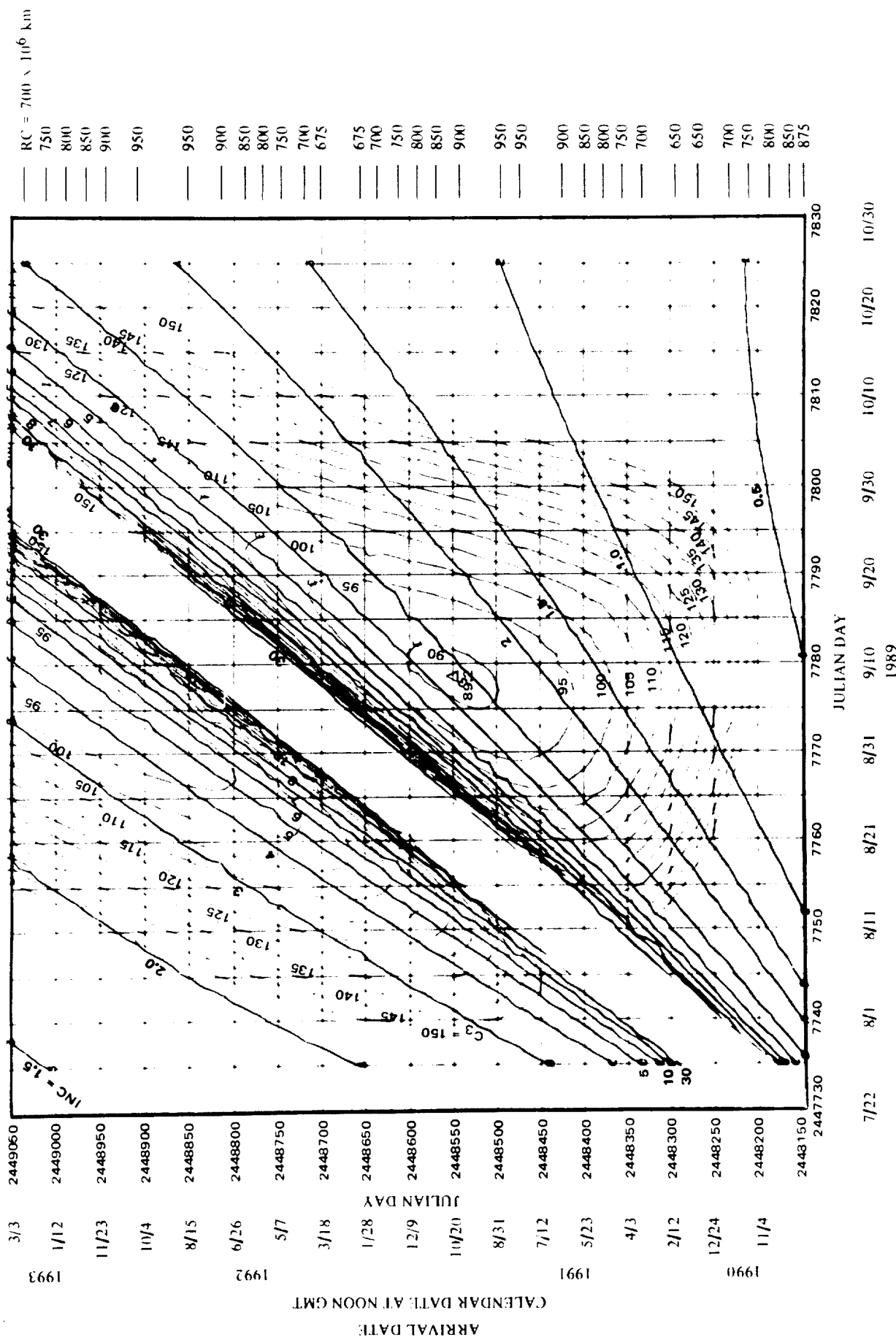
CONTOURS OF  $C_3$  AND FLIGHT TIMES EARTH TO JUPITER 1989

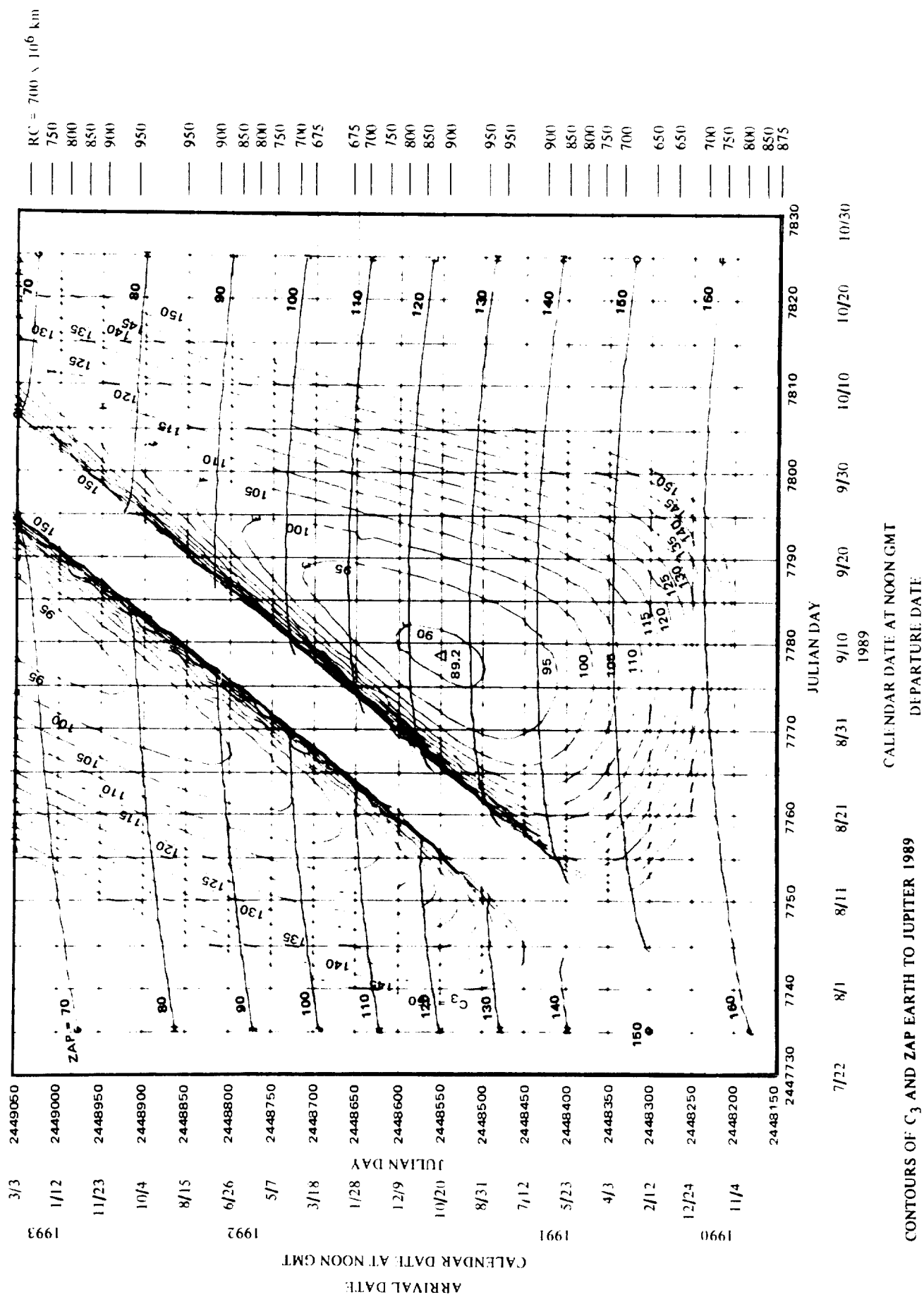


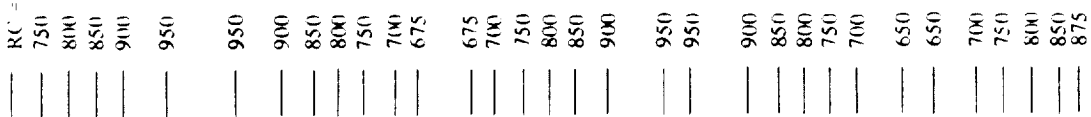


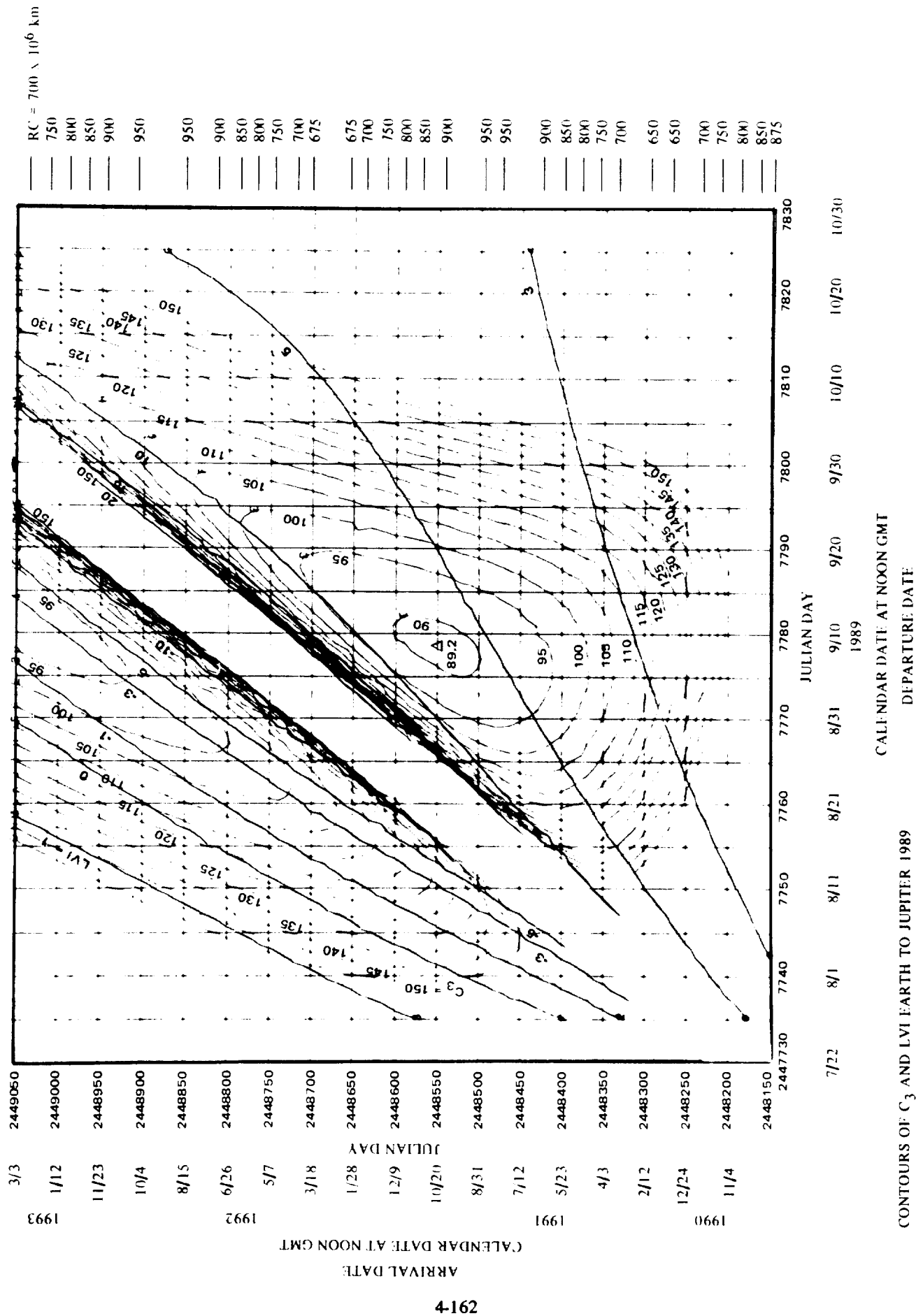


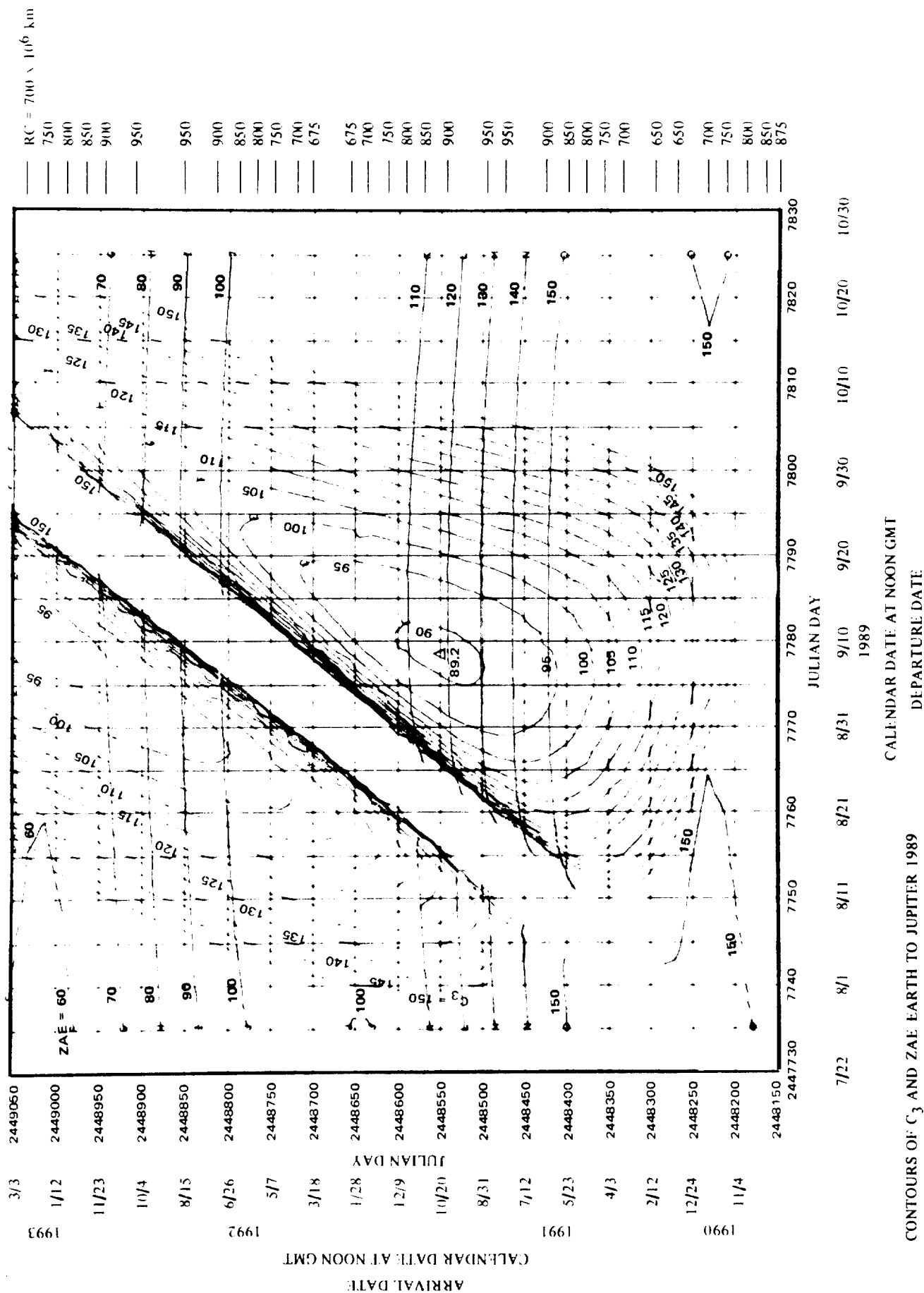


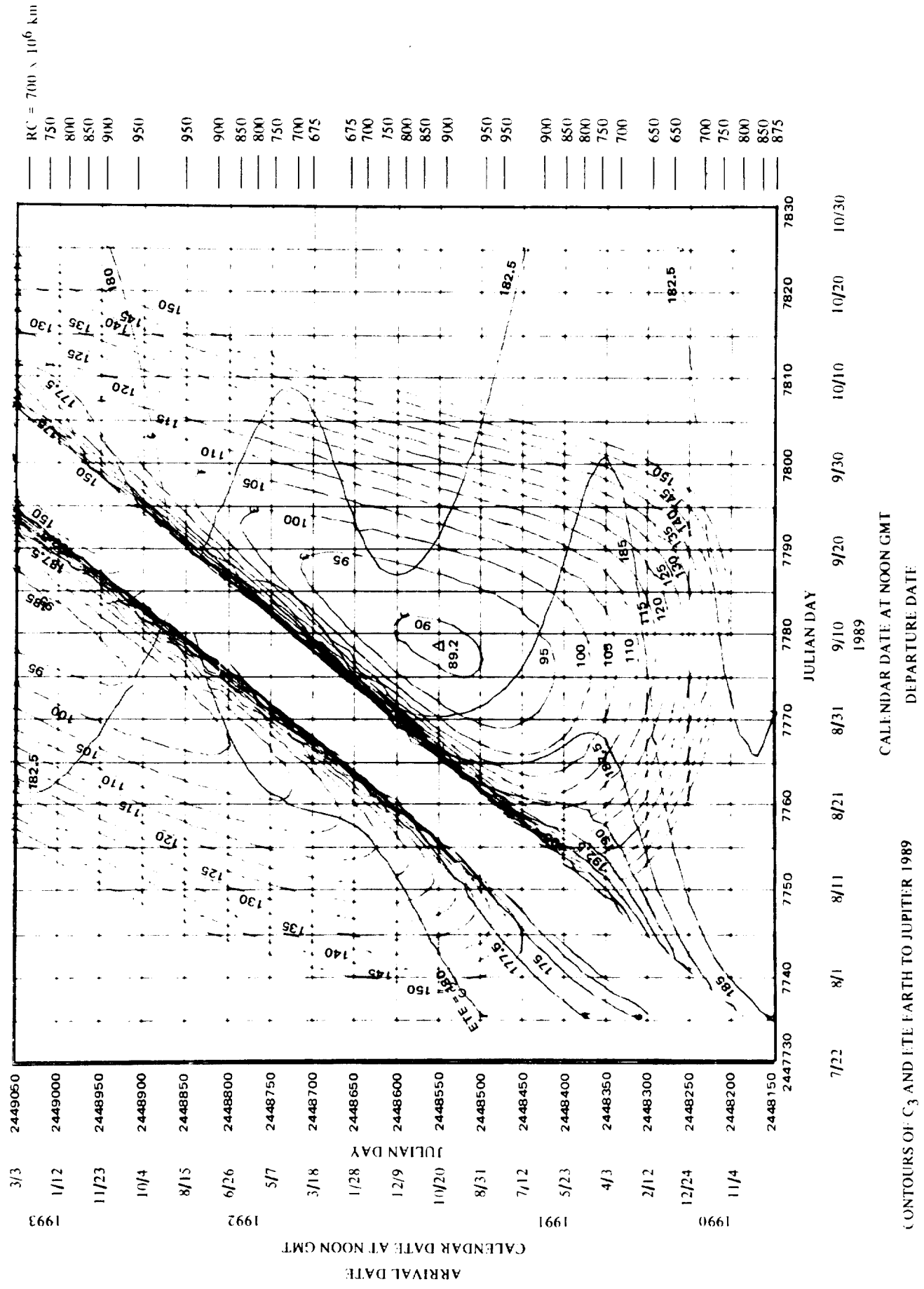


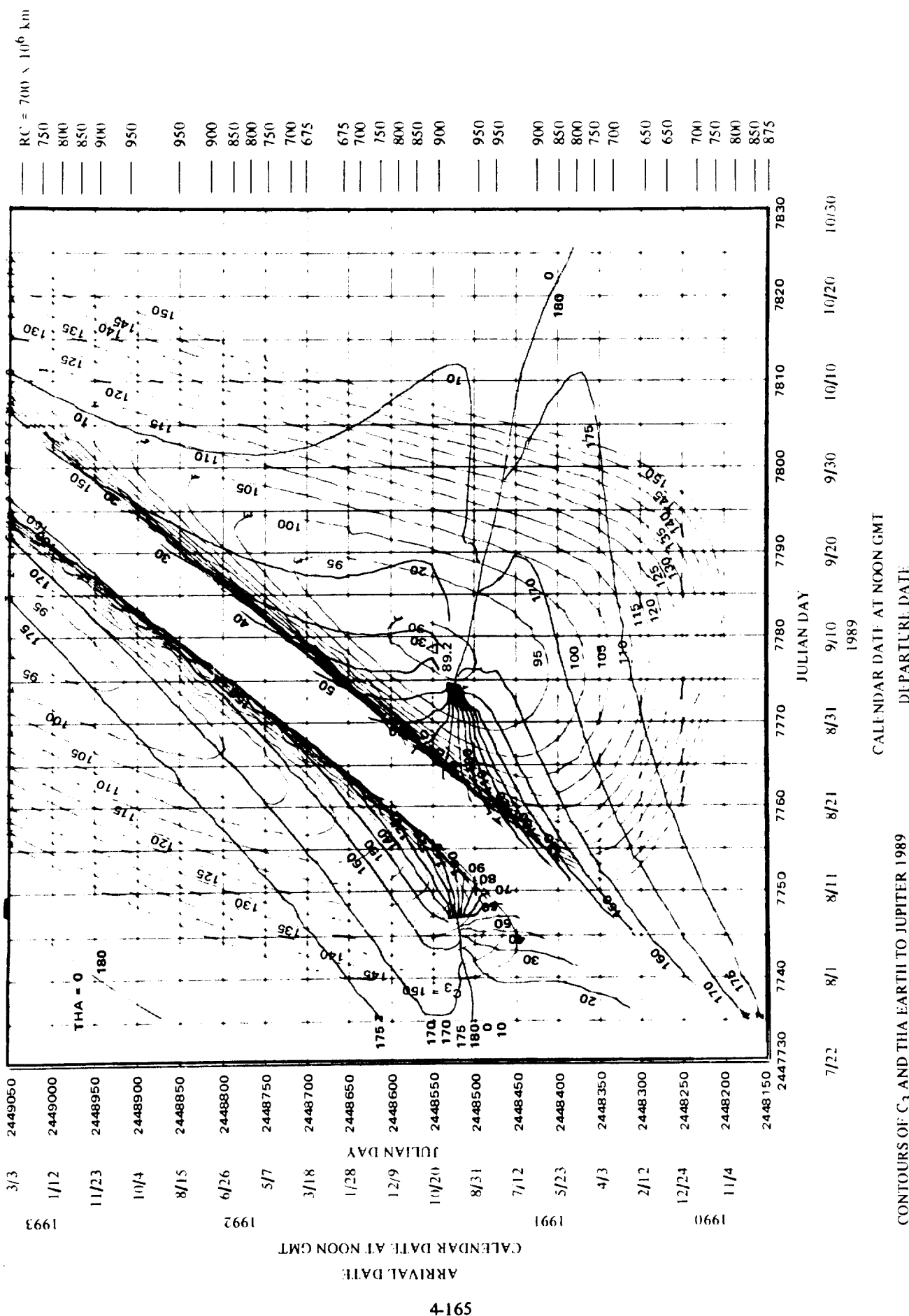


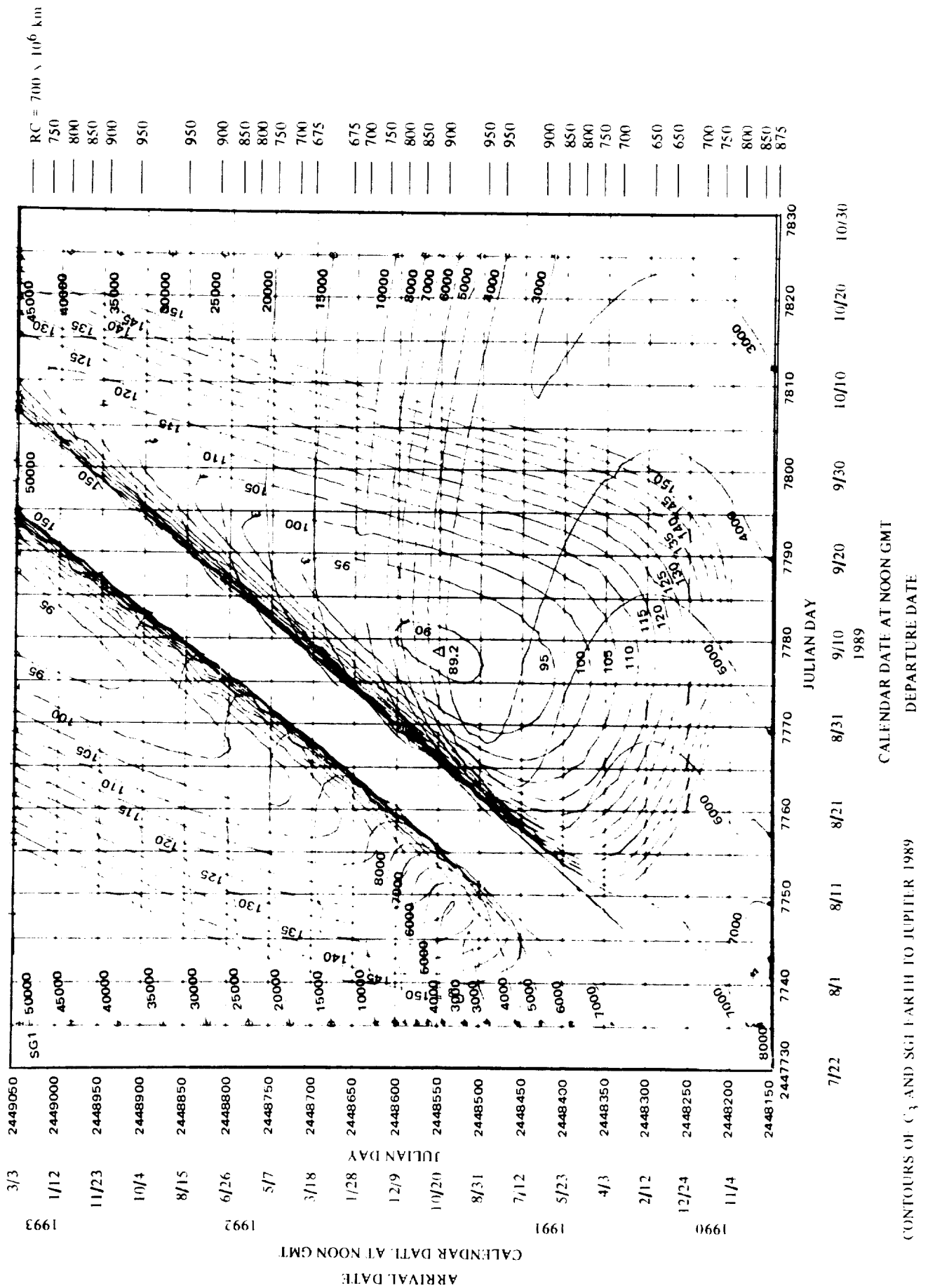




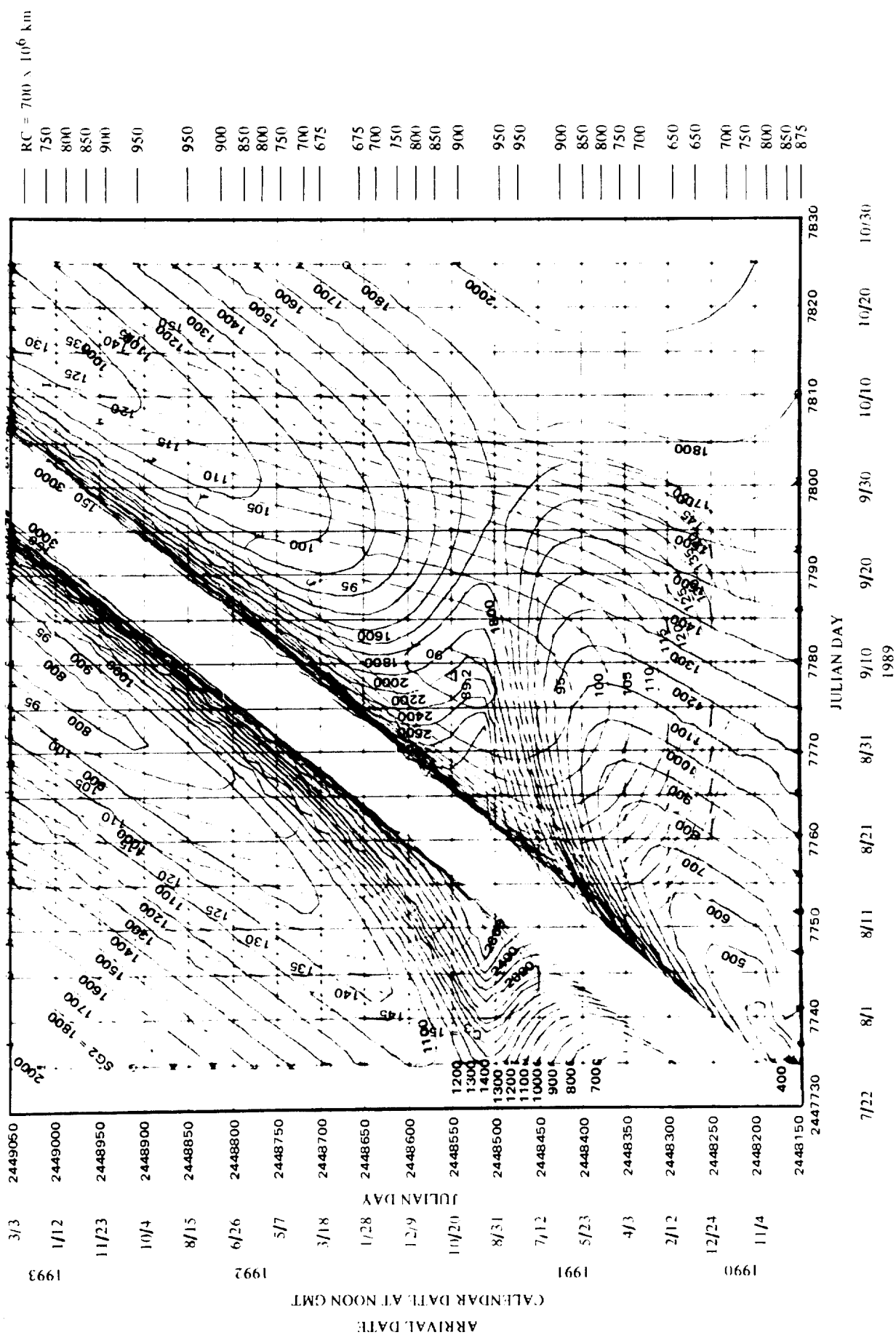




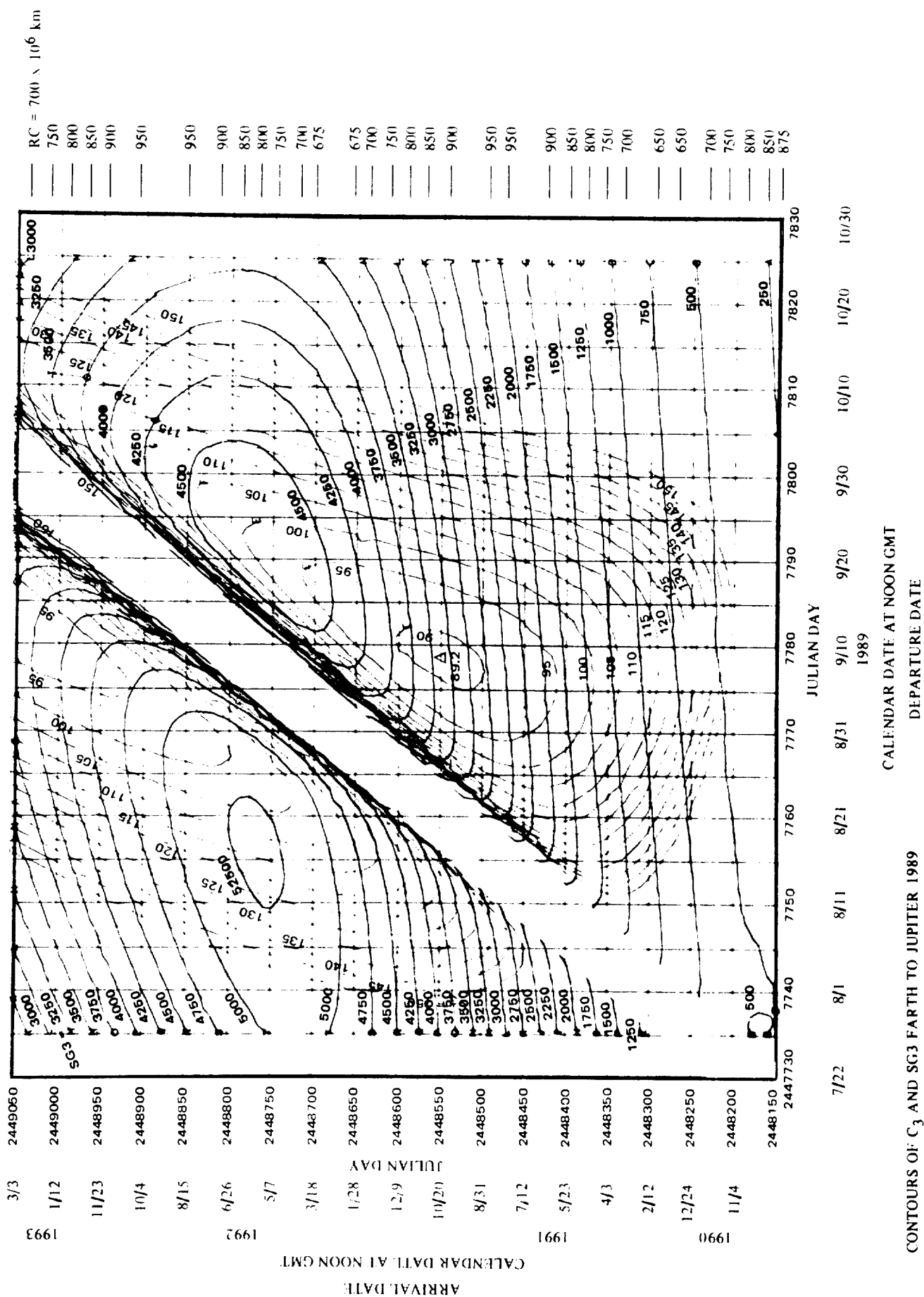


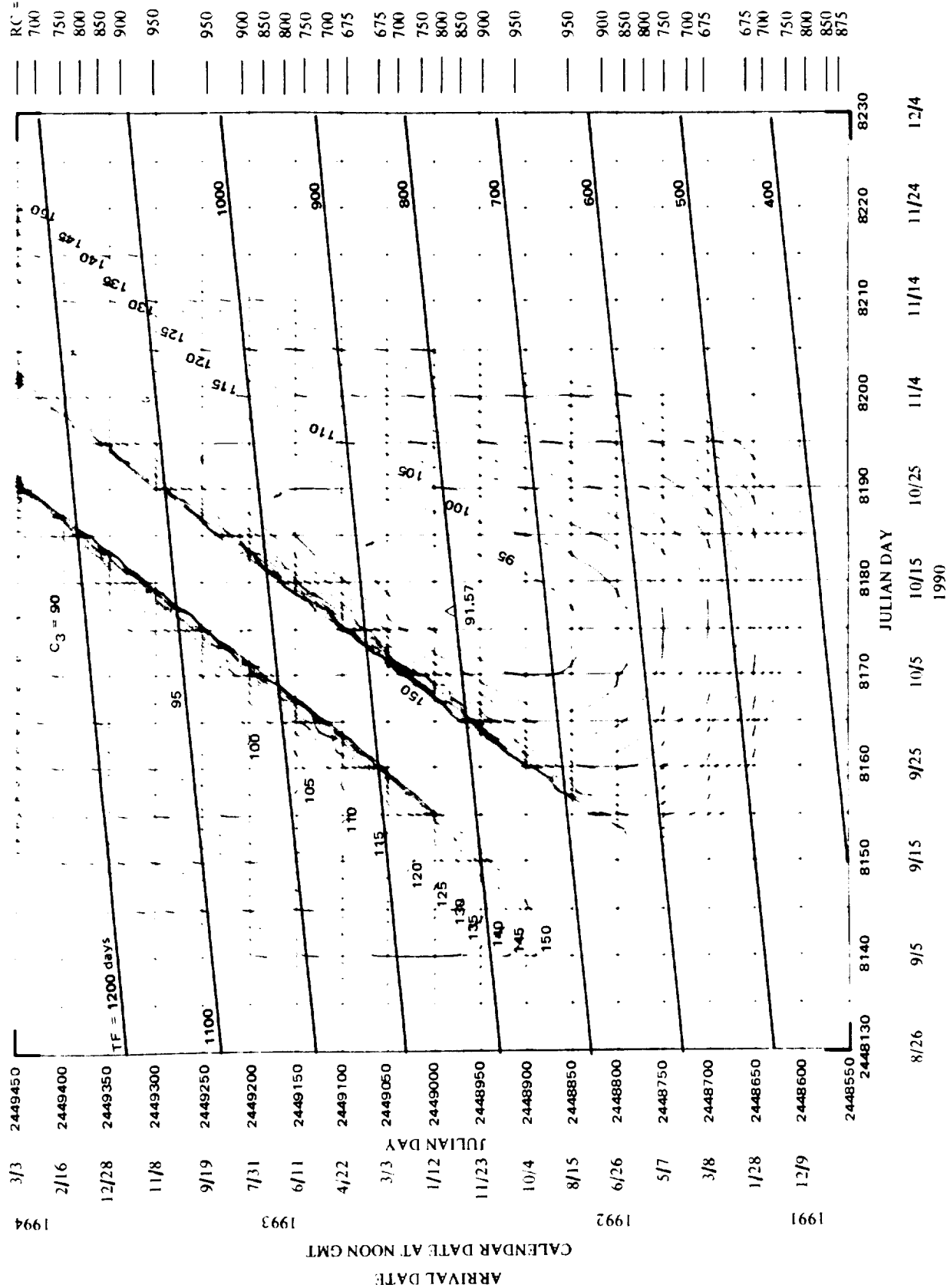






CONTOURS OF  $C_3$  AND SG2 EARTH TO JUPITER 1989



$$RC = 675 \times 10^6 \text{ km}$$


CALENDAR DATE AT NOON GMT

CONTOURS OF  $C_3$  AND FLIGHT TIMES EARTH TO JUPITER 1990

DEPARTURE DATE

1990

JULIAN DAY

8230

1661

7661

3661

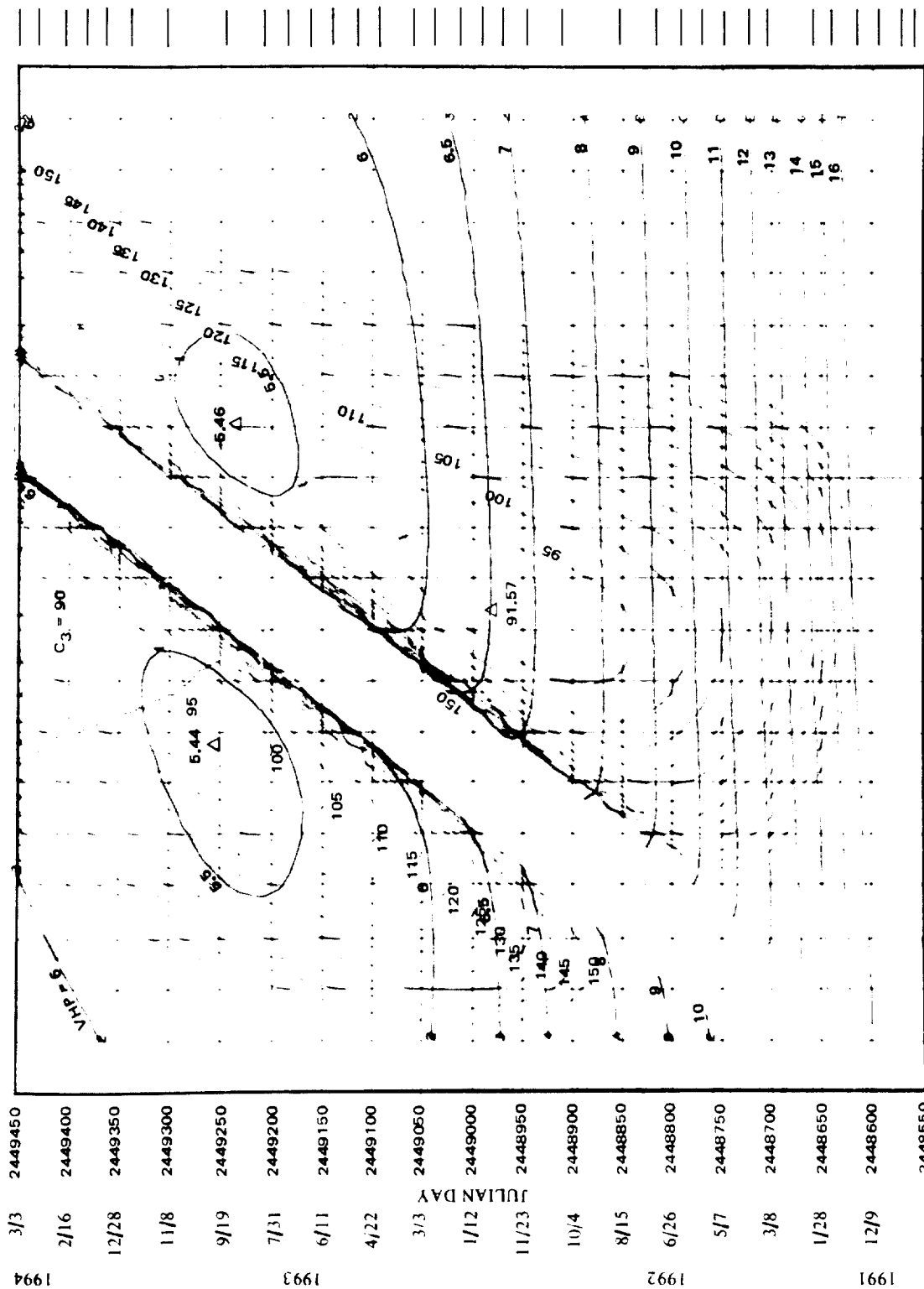
2661

CALENDAR DATE AT NOON GMT

ARRIVAL DATE

4169

RC = 675 x 10<sup>6</sup> km



ARRIVAL DATE  
 1994 3/3 2449450  
 2/16 2449400  
 12/28 2449350  
 11/8 2449300  
 9/19 2449250  
 7/31 2449200  
 6/11 2449150  
 4/22 2449100  
 3/3 2449050  
 1/12 2449000  
 11/23 2448950  
 10/4 2448900  
 8/15 2448850  
 6/26 2448800  
 5/7 2448750  
 3/8 2448700  
 1/28 2448650  
 12/9 2448600  
 2448550

2448130 8140 8150 8160 8170 8180 8190 8200 8210 8220 8230

JULIAN DAY

8/26 9/5 9/15 9/25 10/5 10/15 10/25 11/4 11/14 11/24 12/4

1990

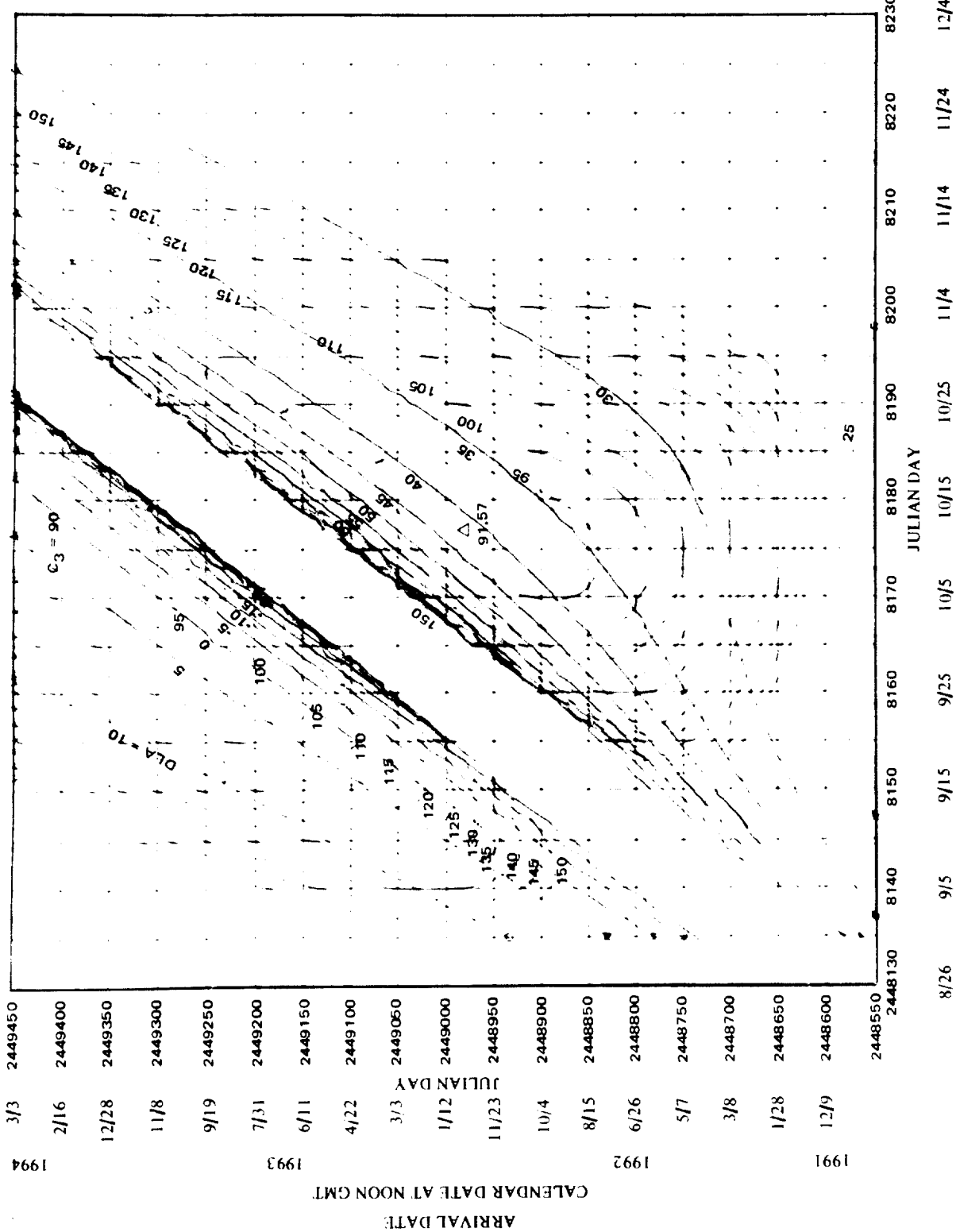
CALENDAR DATE AT NOON GMT

DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND VHP EARTH TO JUPITER 1990

RC = 675 x 10<sup>6</sup> km

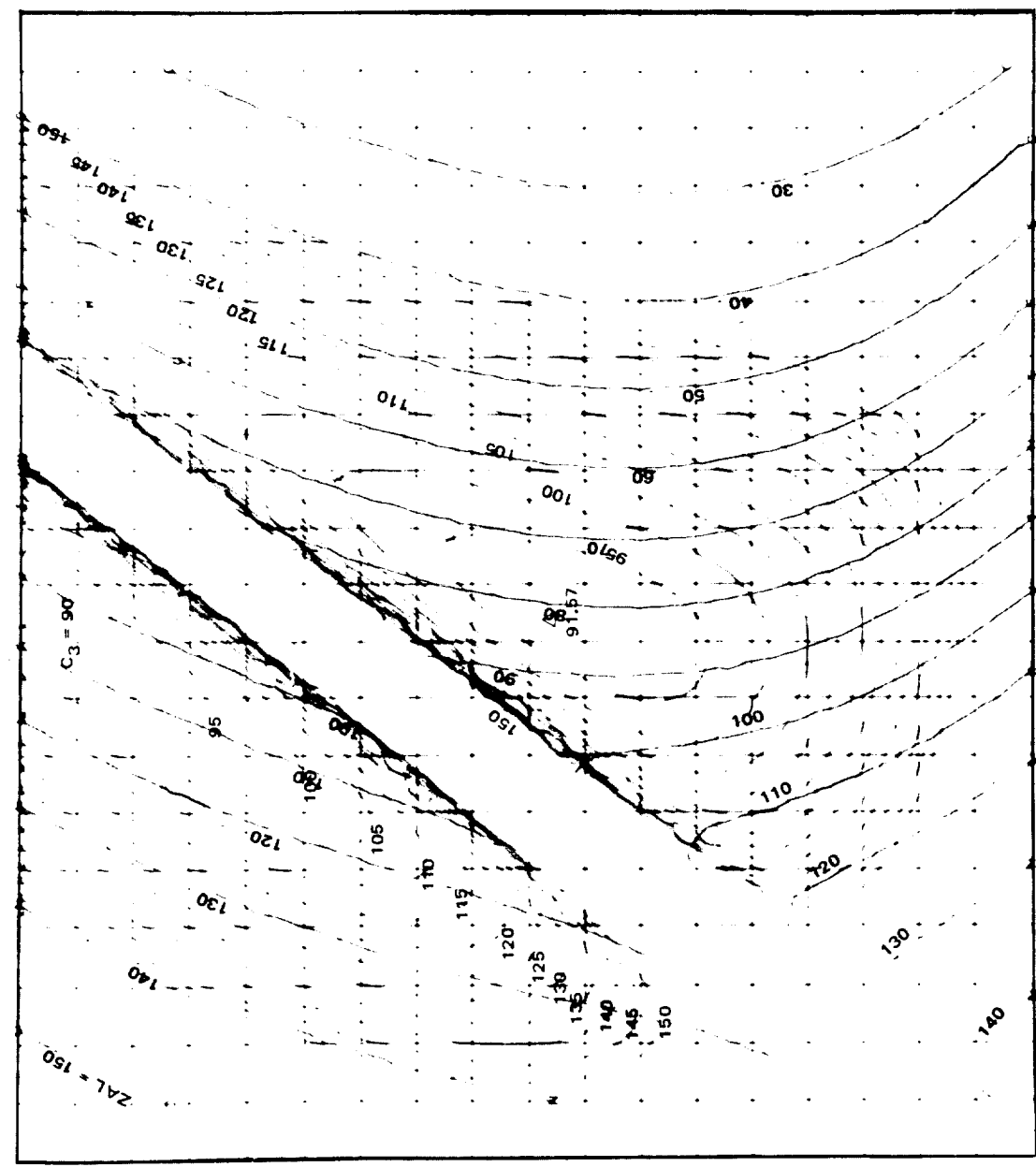
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950



CONTOURS OF C<sub>3</sub> AND DLA FARTH TO JUPITER 1990

RC =  $675 \times 10^6$  km

700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
875

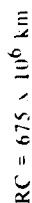


8/26 9/5 9/15 9/25 10/5 10/15 10/25 11/4 11/14 11/24 12/4  
JULIAN DAY  
1990  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

CONTOURS OF  $C_3$  AND  $ZAL$  EARTH TO JUPITER 1990

CALENDAR DATE AT NOON GMT

DEPARTURE DATE



CONTOURS OF  $C_3$  AND INC EARTH TO JUPITER 1990

CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

1990

	8/26	9/5	9/15	9/25	10/5	10/15	10/25	11/4	11/14	11/24	12/4
--	------	-----	------	------	------	-------	-------	------	-------	-------	------

JULIAN DAY

[illegible]

1661

7661

£661

466

ARRIVAL DATE:

CALENDAR DATE AT NOON GMT

JULIAN DAY

313 x

7714

33

11/19

7/31

61/6

118

2128

1

2/16

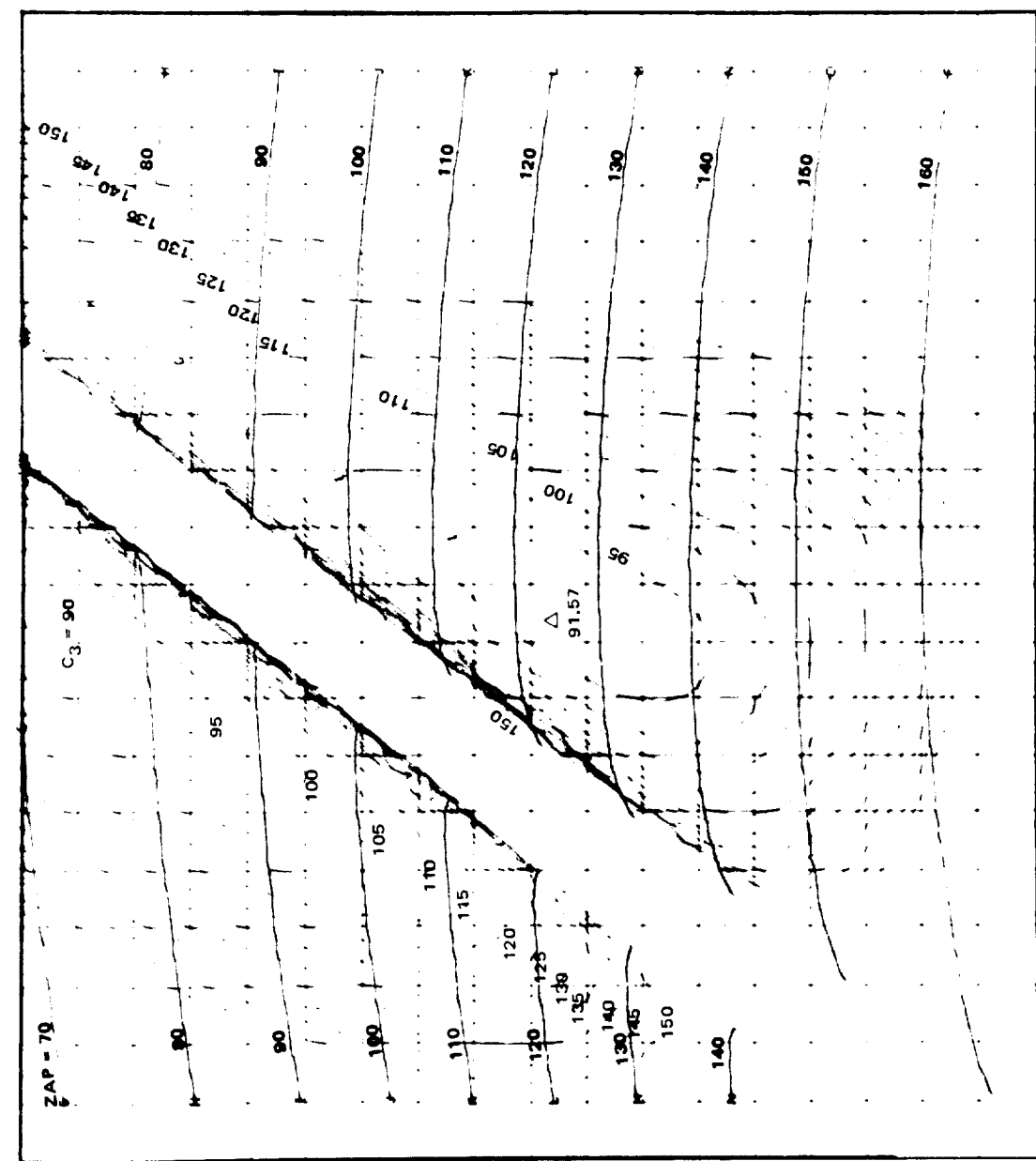
21

213

4173

RC =  $675 \times 10^6$  km

700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
875



3/3 2449450  
2/16 2449400  
12/28 2449350  
11/8 2449300  
9/19 2449250  
7/31 2449200  
6/11 2449150  
4/22 2449100  
3/3 2449050  
1/12 2449000  
11/23 2448950  
10/4 2448900  
8/15 2448850  
6/26 2448800  
5/7 2448750  
3/8 2448700  
1/28 2448650  
12/9 2448600  
2448550

1994  
1993  
1992  
1991

CALENDAR DATE AT NOON GMT  
JULIAN DAY  
CALENDAR DATE AT NOON GMT  
DEPARTURE DATE

8230  
8220  
8210  
8200  
8190  
8180  
8170  
8160  
8150  
8140  
8130

8/26 9/5 9/15 9/25 10/5 10/15 10/25 11/4 11/14 11/24 12/4

CONTOURS OF  $C_3$  AND ZAP EARTH TO JUPITER 1990

DEPARTURE DATE

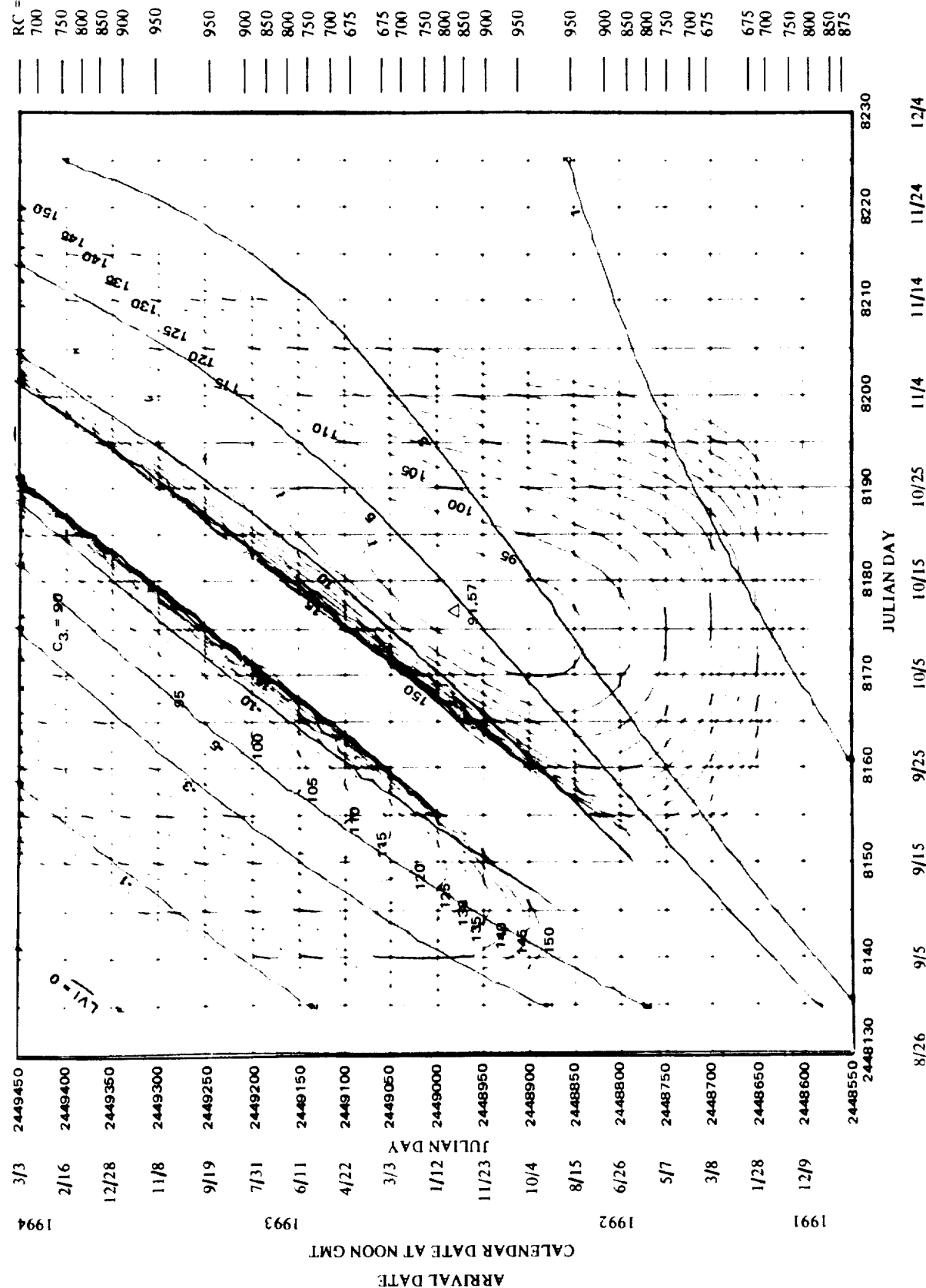
CALENDAR DATE AT NOON GMT

1990



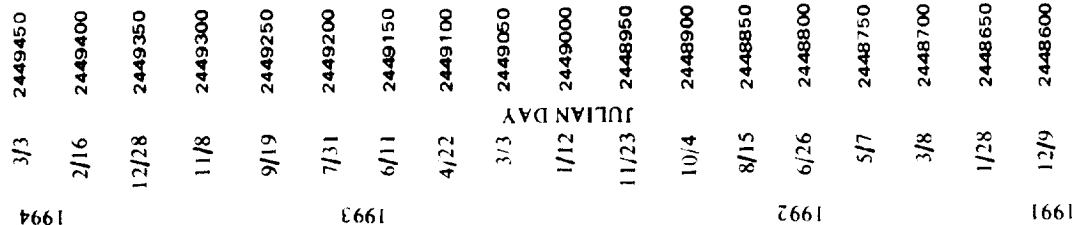
CONTOURS OF  $C_3$  AND ETS EARTH TO JUPITER 1990

RC =  $675 \times 10^6$  km



CONTOURS OF  $C_3$  AND  $LVI$  EARTH TO JUPITER 1990

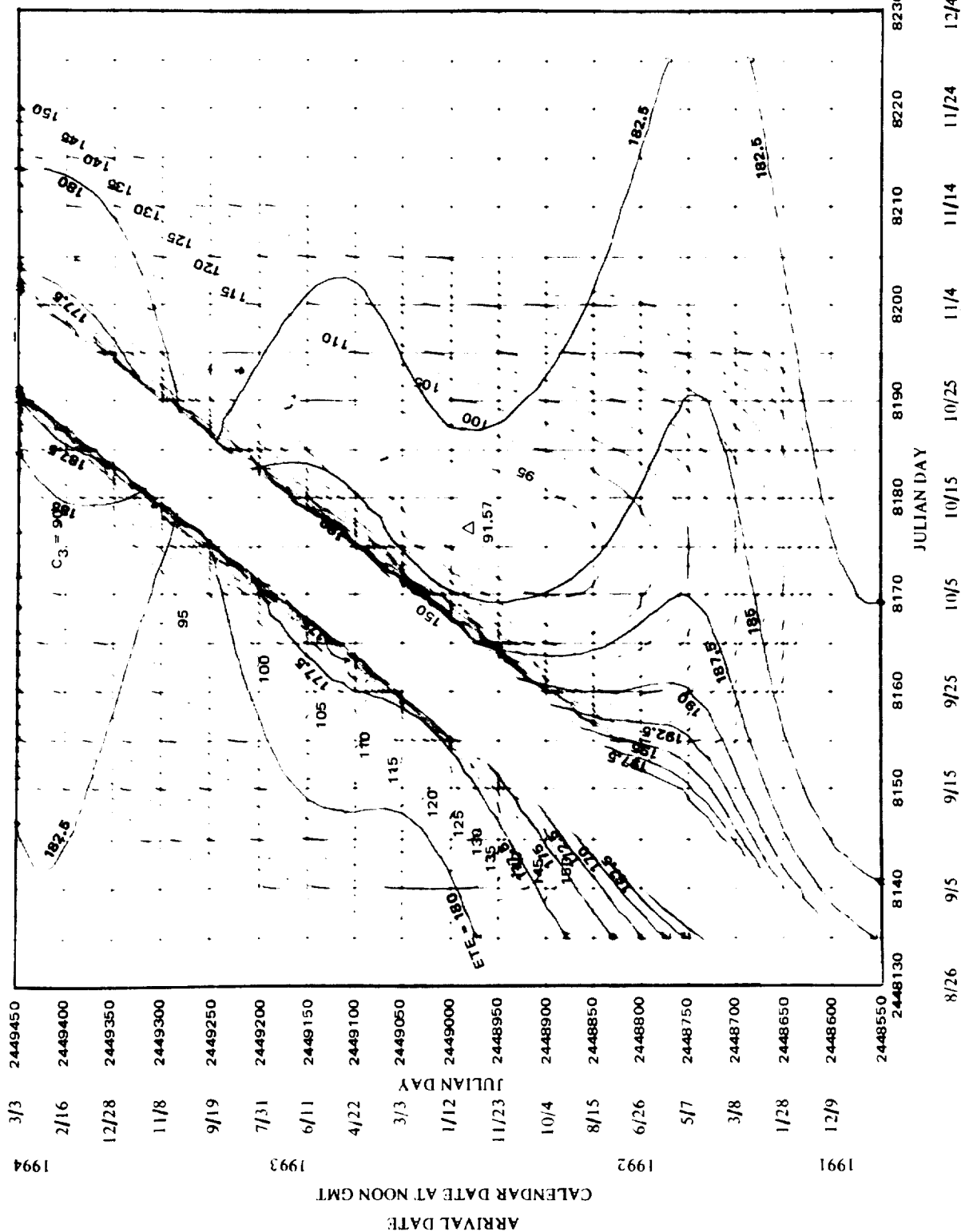
RRC =
700
750
800
850
900
950
950
900
850
800
750
700
675
675
700
750
800
850
900
950
950
900
850
800
750
700
675
675
700
750
800
850
875



CONTOURS OF  $C_3$  AND ZAE EARTH TO JUPITER 1990

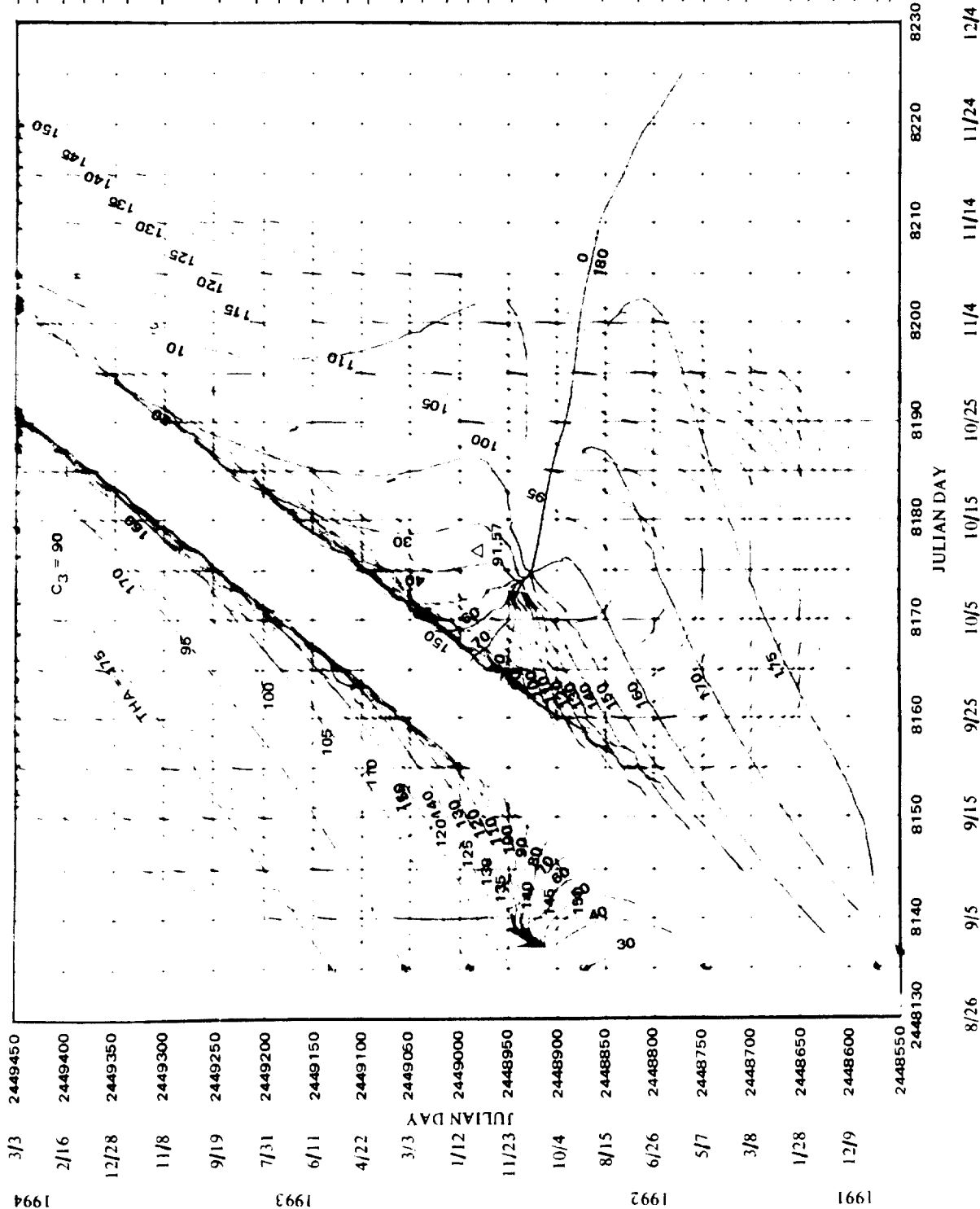
RC =  $675 \times 10^6$  km

700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
875



RC = 675 x 10<sup>6</sup> km

700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950  
  
950  
900  
850  
800  
750  
700  
675  
  
675  
700  
750  
800  
850  
900  
950



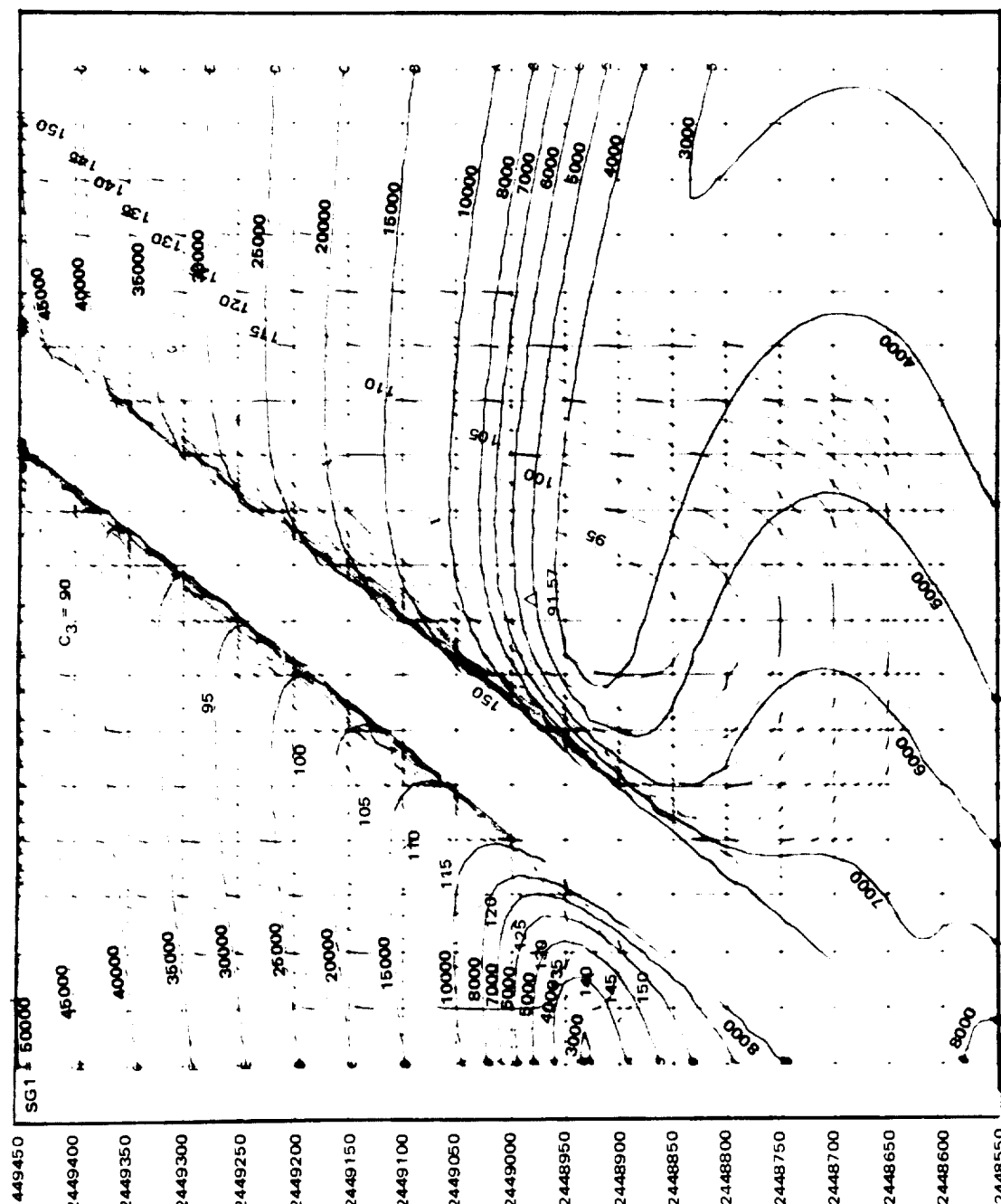
CALENDAR DATE AT NOON GMT

DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND THA EARTH TO JUPITER 1990

RC =  $675 \times 10^6$  km

700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900  
950



8/26 9/5 9/15 9/25 10/5 10/15 10/25 11/4 11/14 11/24 12/4

CALENDAR DATE AT NOON GMT

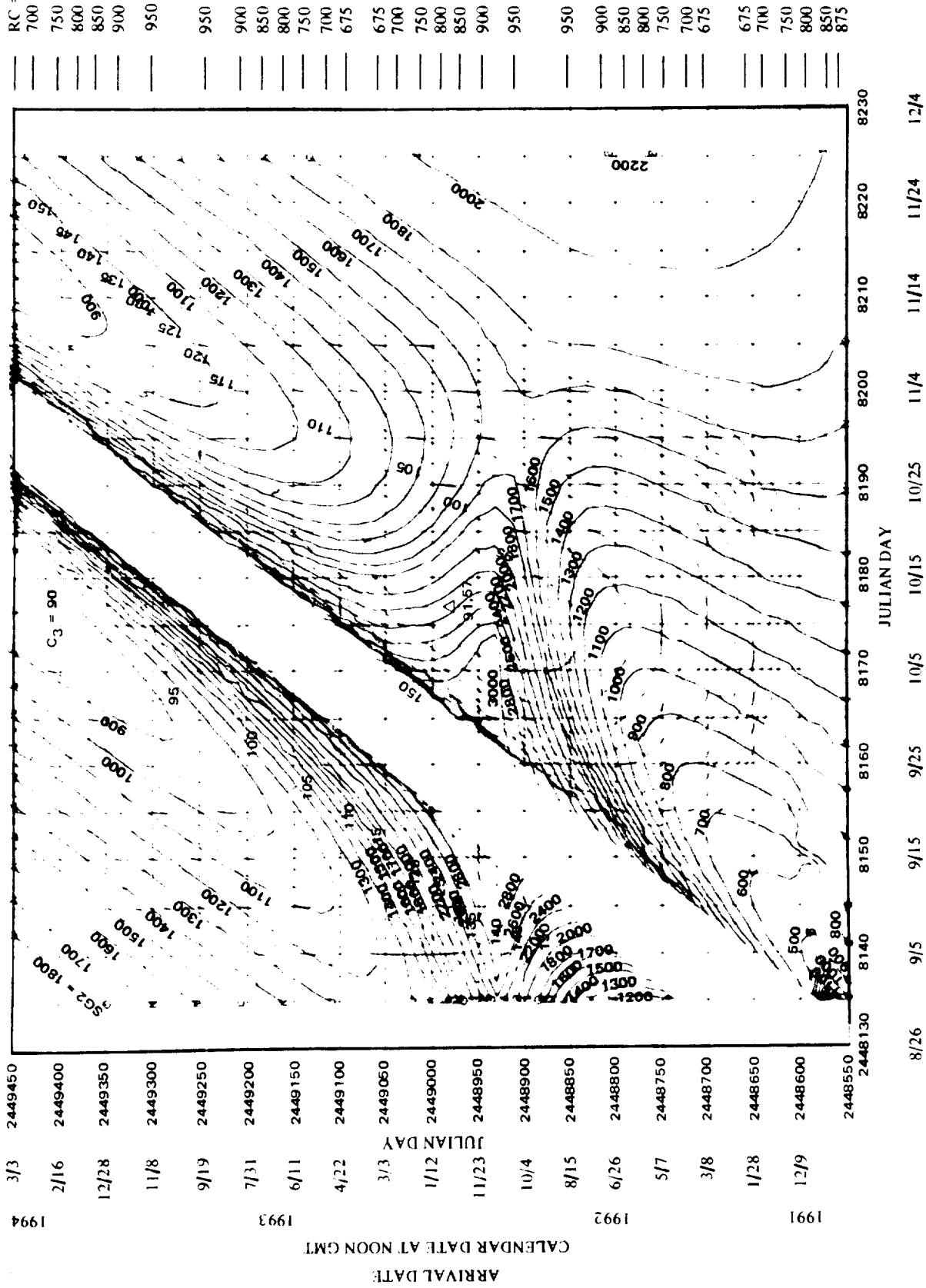
1990

DEPARTURE DATE

CONTOURS OF C<sub>3</sub> AND SG1 EARTH TO JUPITER 1990

ARRIVAL DATE  
CALENDAR DATE AT NOON GMT  
JULIAN DAY  
1994  
3/3 2449450  
2/16 2449400  
12/28 2449350  
11/8 2449300  
9/19 2449250  
7/31 2449200  
6/11 2449150  
4/22 2449100  
3/3 2449050  
1/12 2449000  
11/23 2448950  
10/4 2448900  
8/15 2448850  
6/26 2448800  
5/7 2448750  
3/8 2448700  
1/28 2448650  
12/9 2448600  
2448550

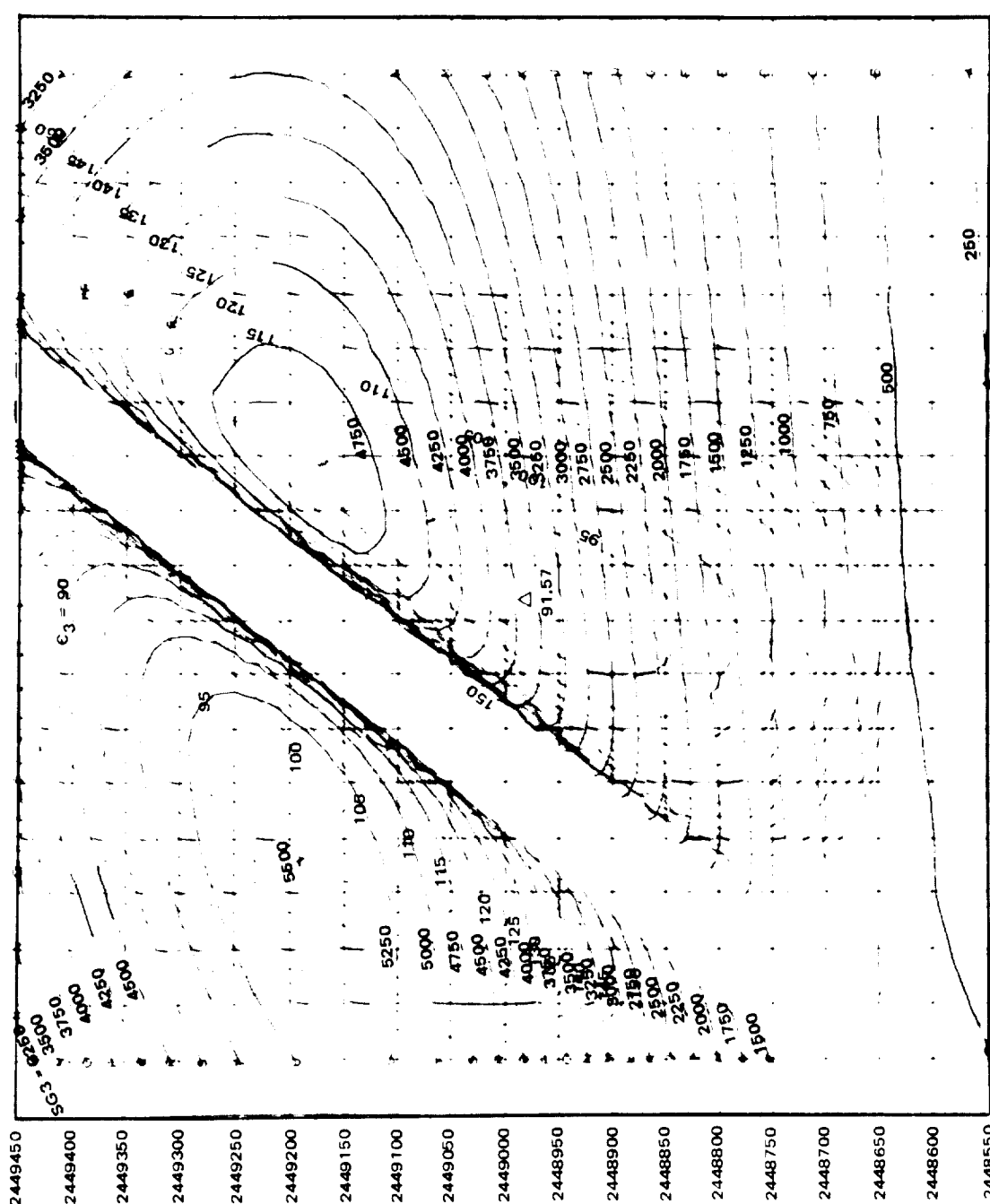
RC = 675 x 10<sup>6</sup> km



CONTOURS OF C<sub>3</sub> AND SG2 EARTH TO JUPITER 1990

RC = 675  $\times$  10<sup>6</sup> km

700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
900  
950  
950  
900  
850  
800  
750  
700  
675  
675  
700  
750  
800  
850  
875



3/3 2449450  
2/16 2449400  
12/28 2449350  
11/8 2449300  
9/19 2449250  
7/31 2449200  
6/11 2449150  
4/22 2449100  
3/3 2449050  
1/12 2449000  
11/23 2448950  
10/4 2448900  
8/15 2448850  
6/26 2448800  
5/7 2448750  
3/8 2448700  
1/28 2448650  
12/9 2448600  
2448550

8/26 9/5 9/15 9/25 10/5 10/15 10/25 11/4 11/14 11/24 12/4

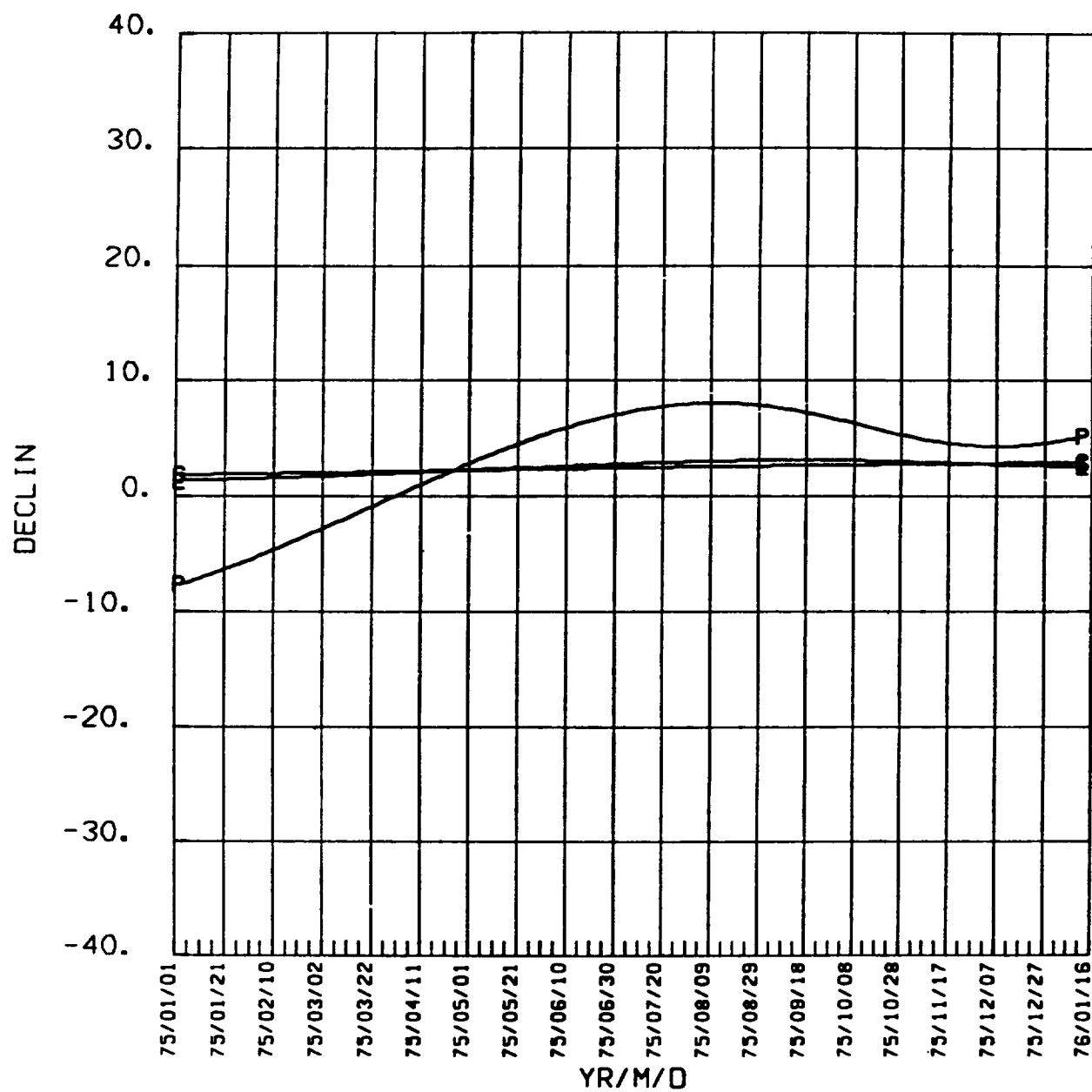
JULIAN DAY

CALENDAR DATE AT NOON GMT  
1990  
DEPARTURE DATE

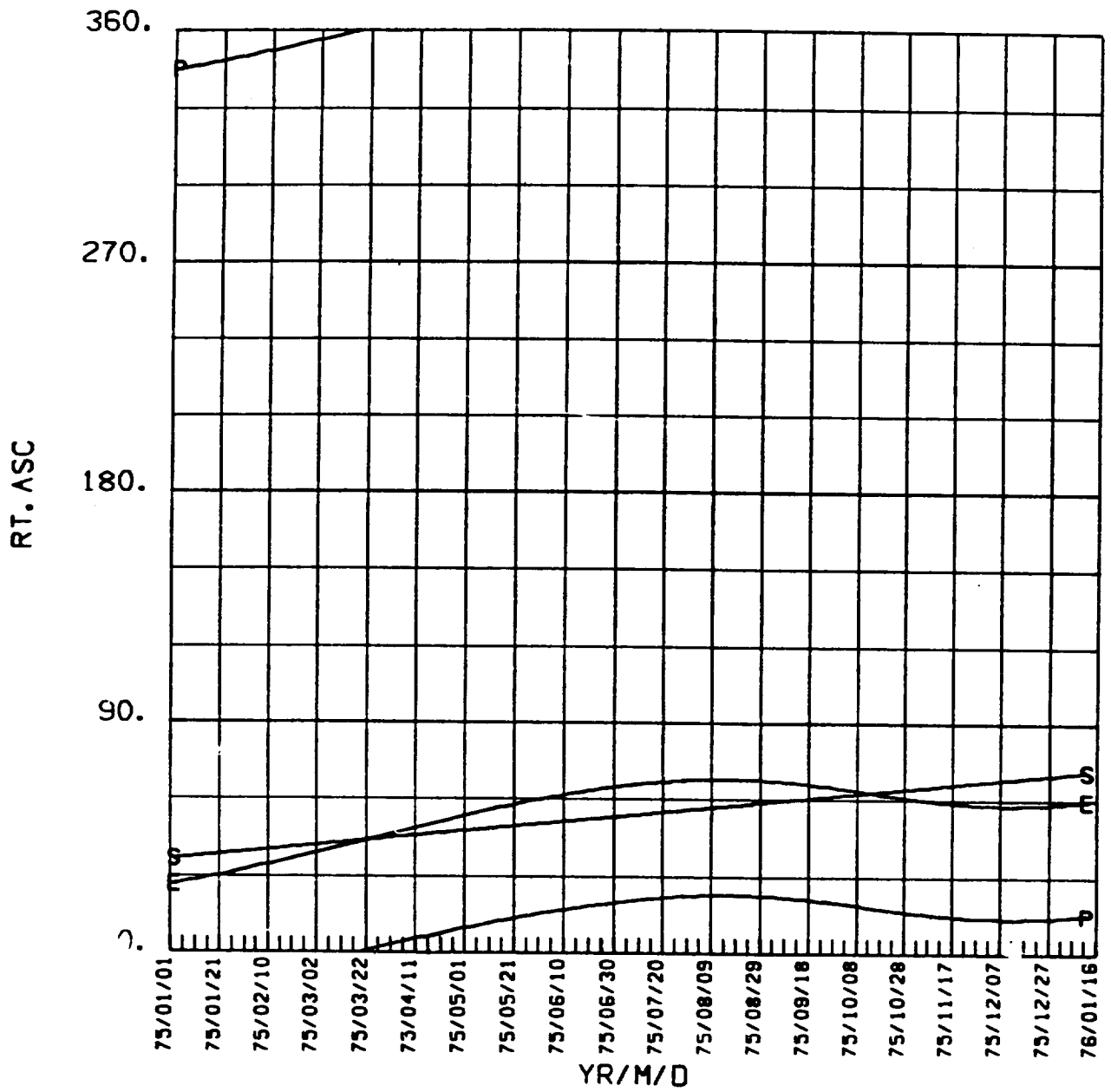
CONTOURS OF C<sub>3</sub> AND SG3 EARTH TO JUPITER 1990



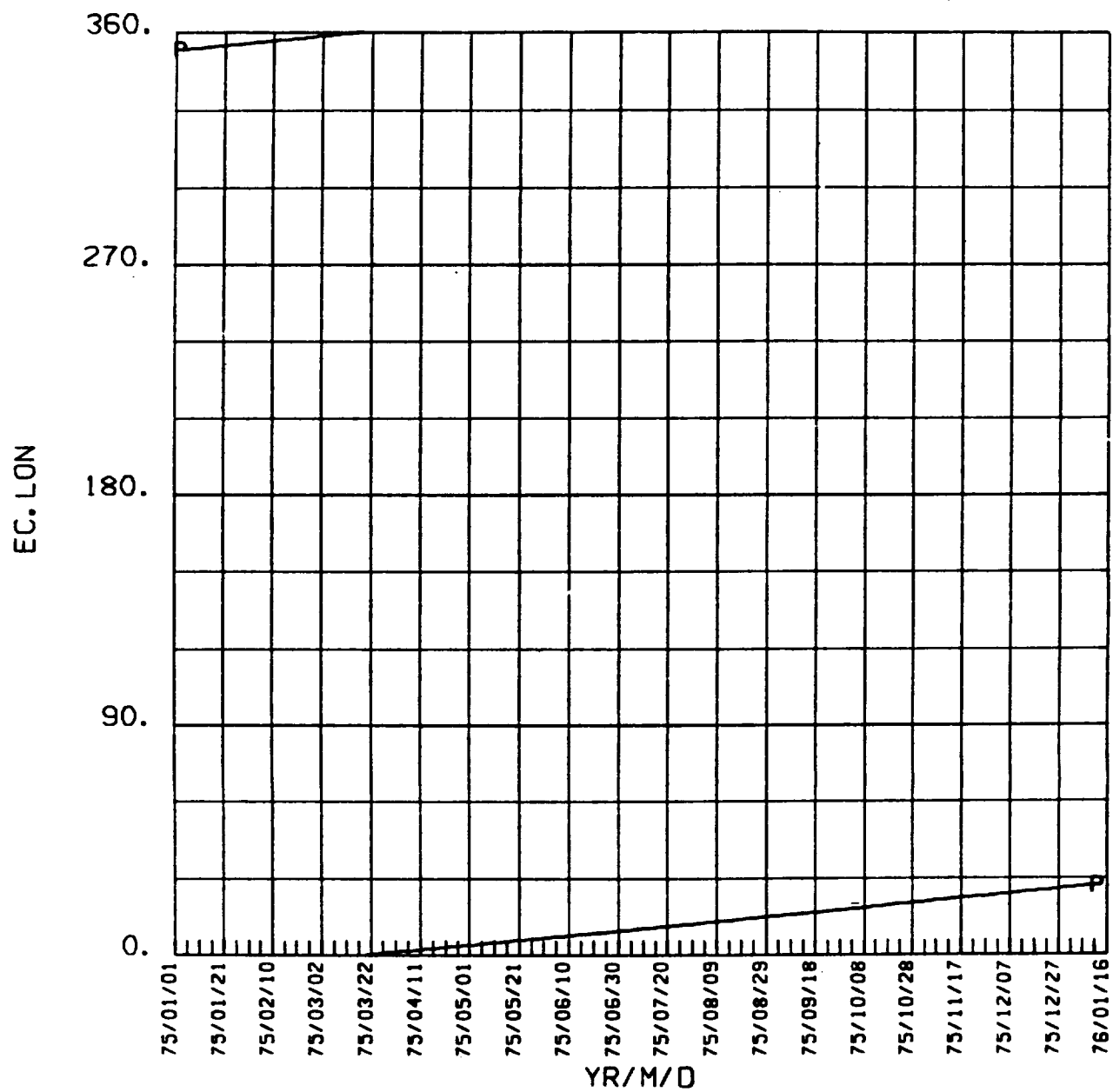
# JUPITER 1975



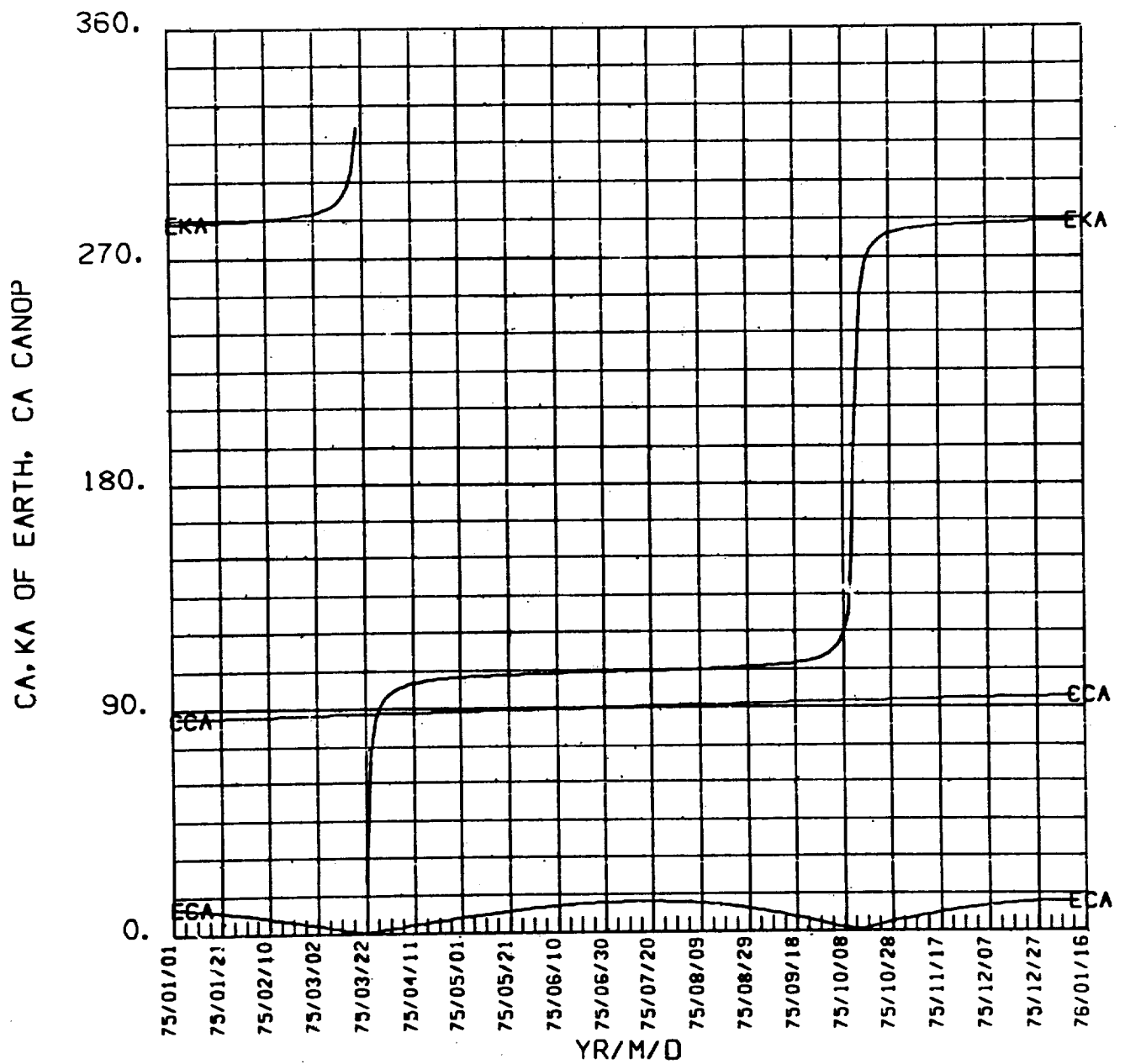
# JUPITER 1975



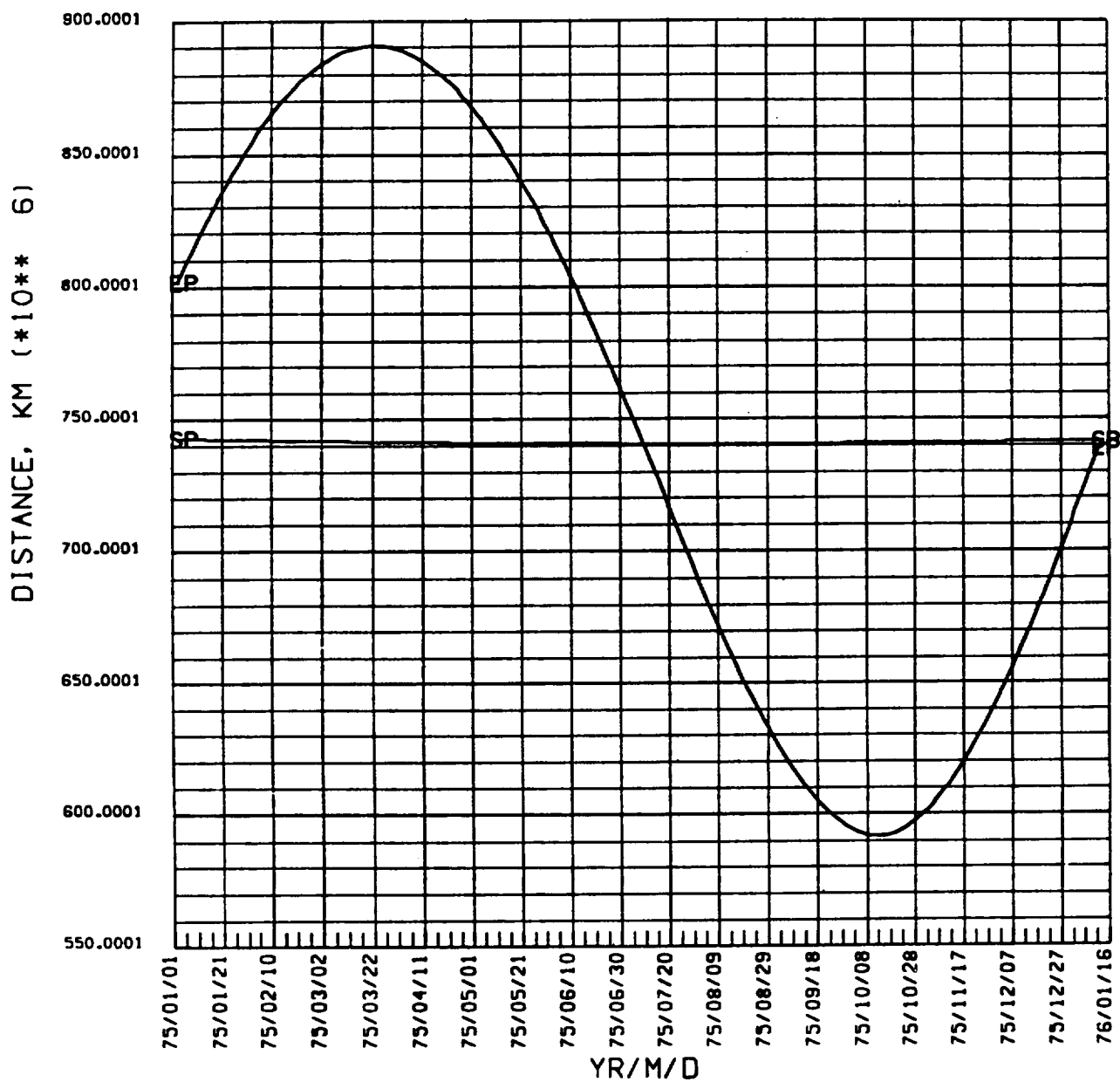
# JUPITER 1975



# JUPITER 1975

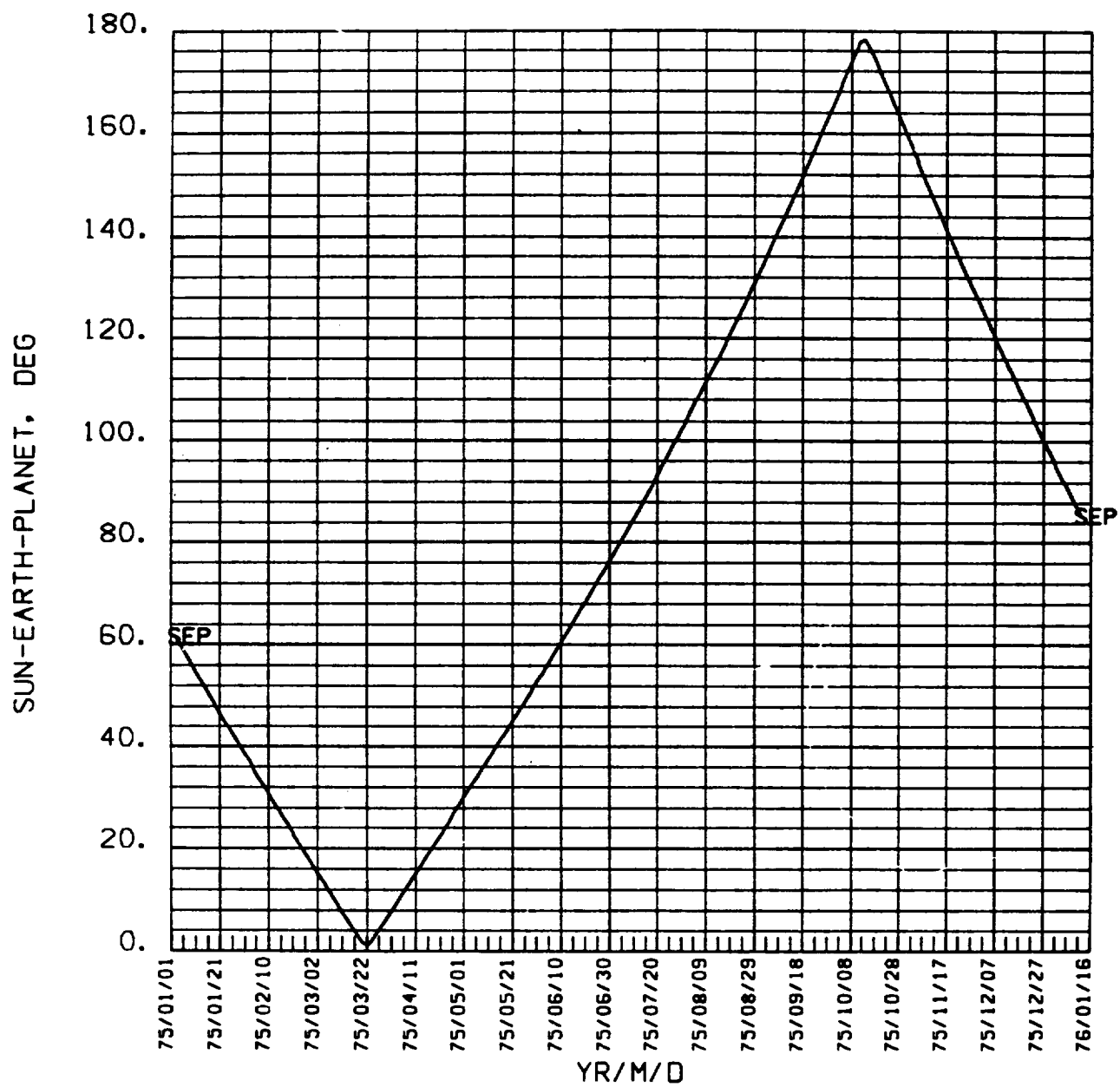


# JUPITER 1975

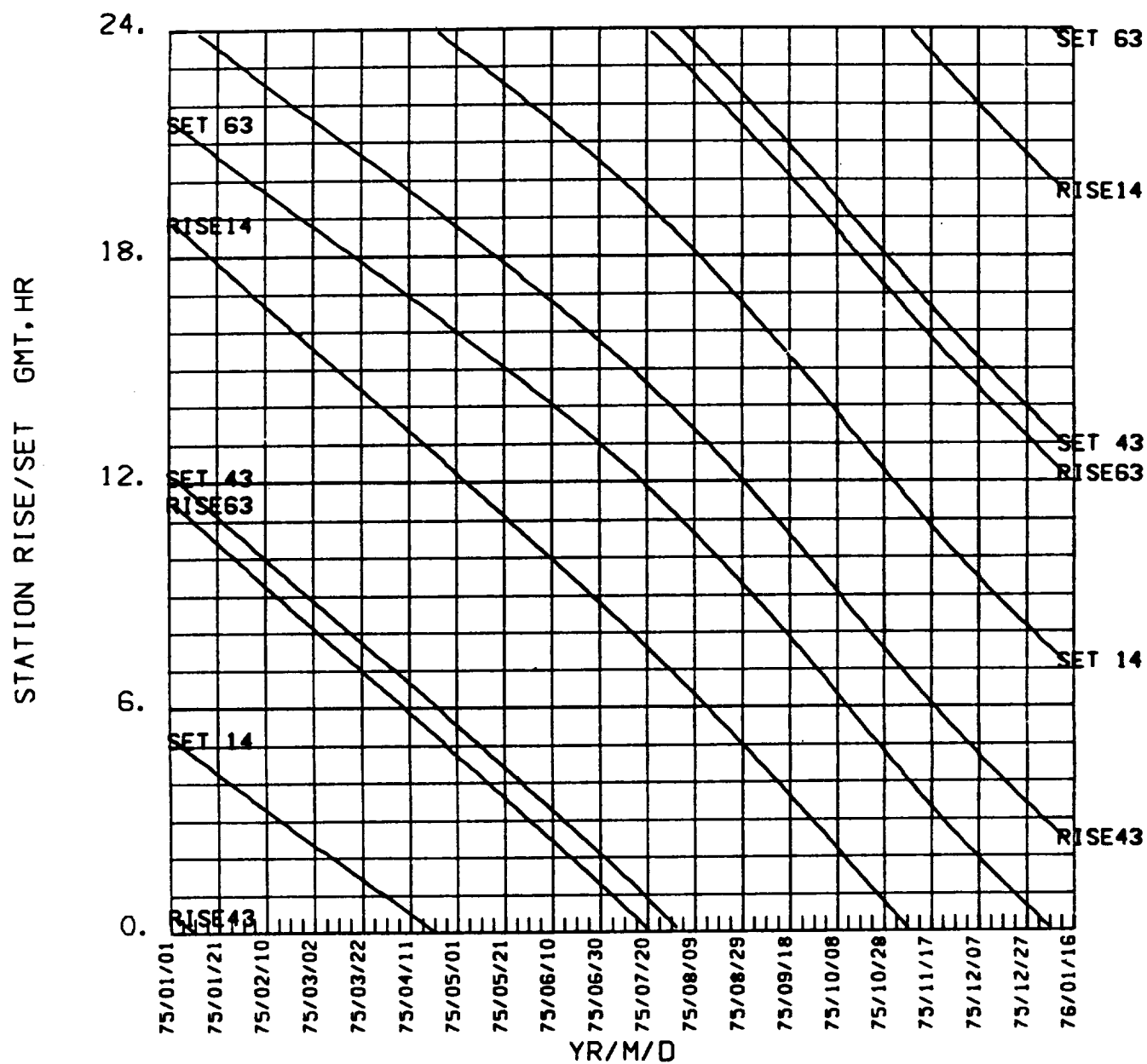


C 3

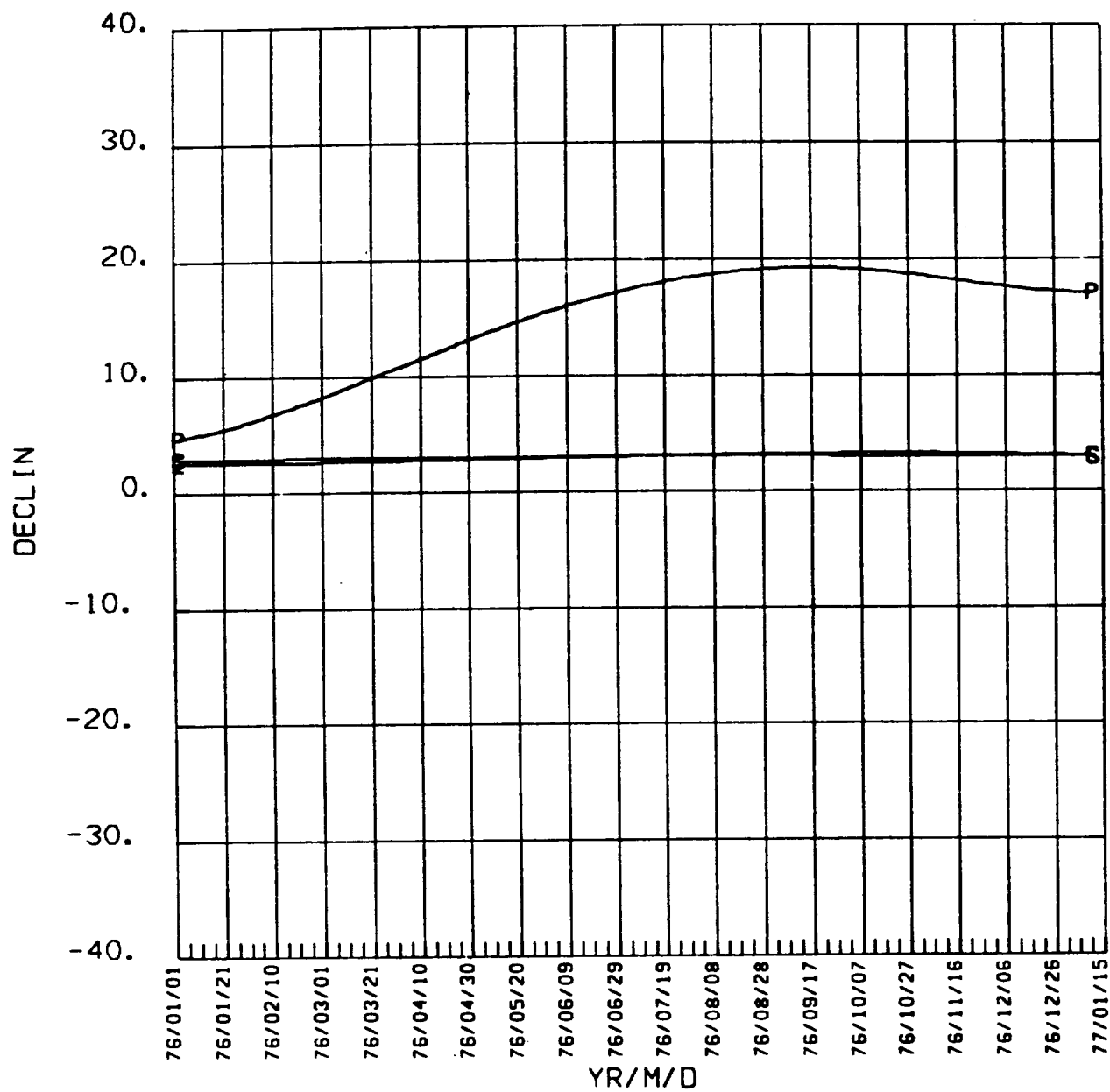
# JUPITER 1975



# JUPITER 1975

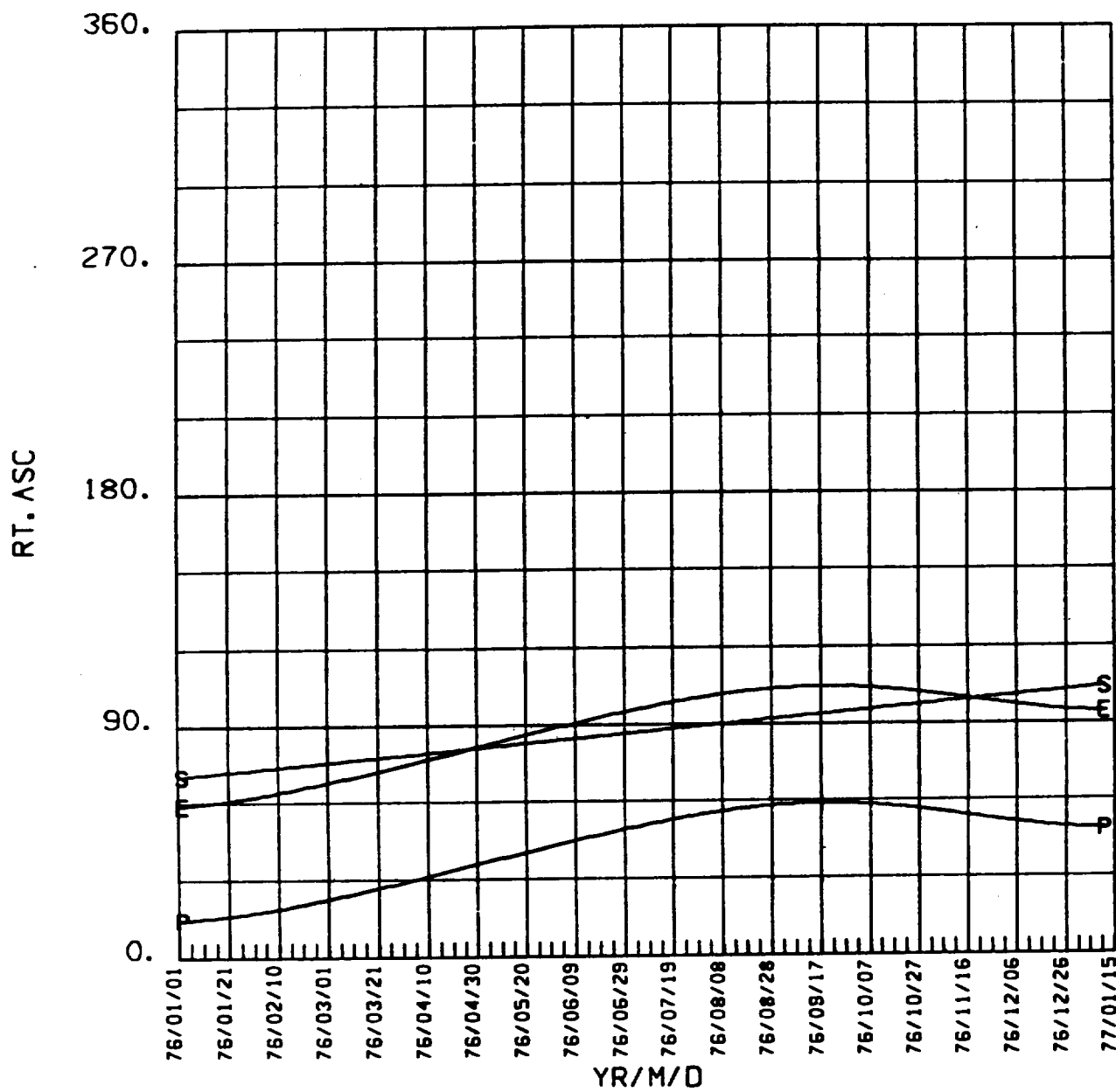


# JUPITER 1976

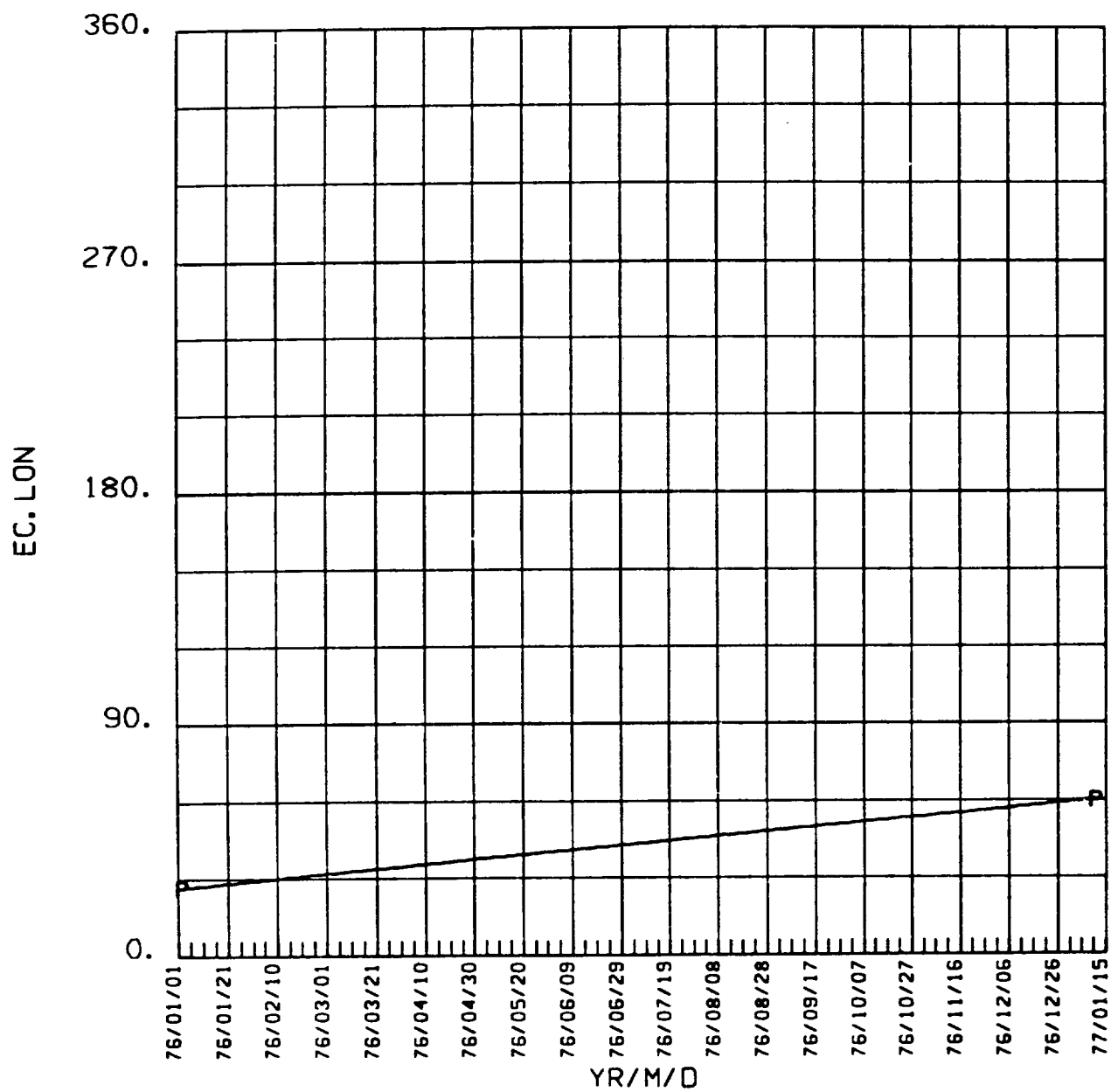




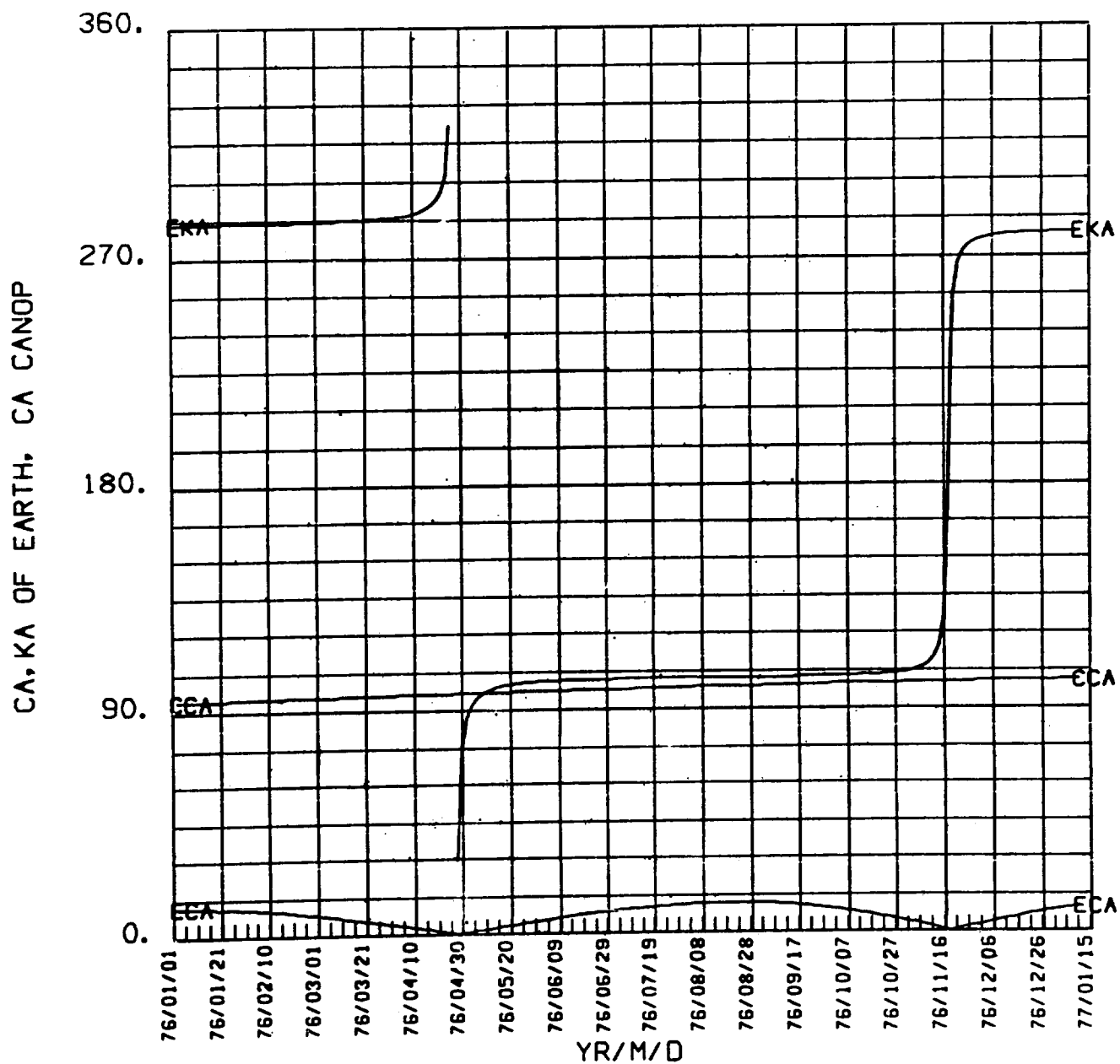
# JUPITER 1976



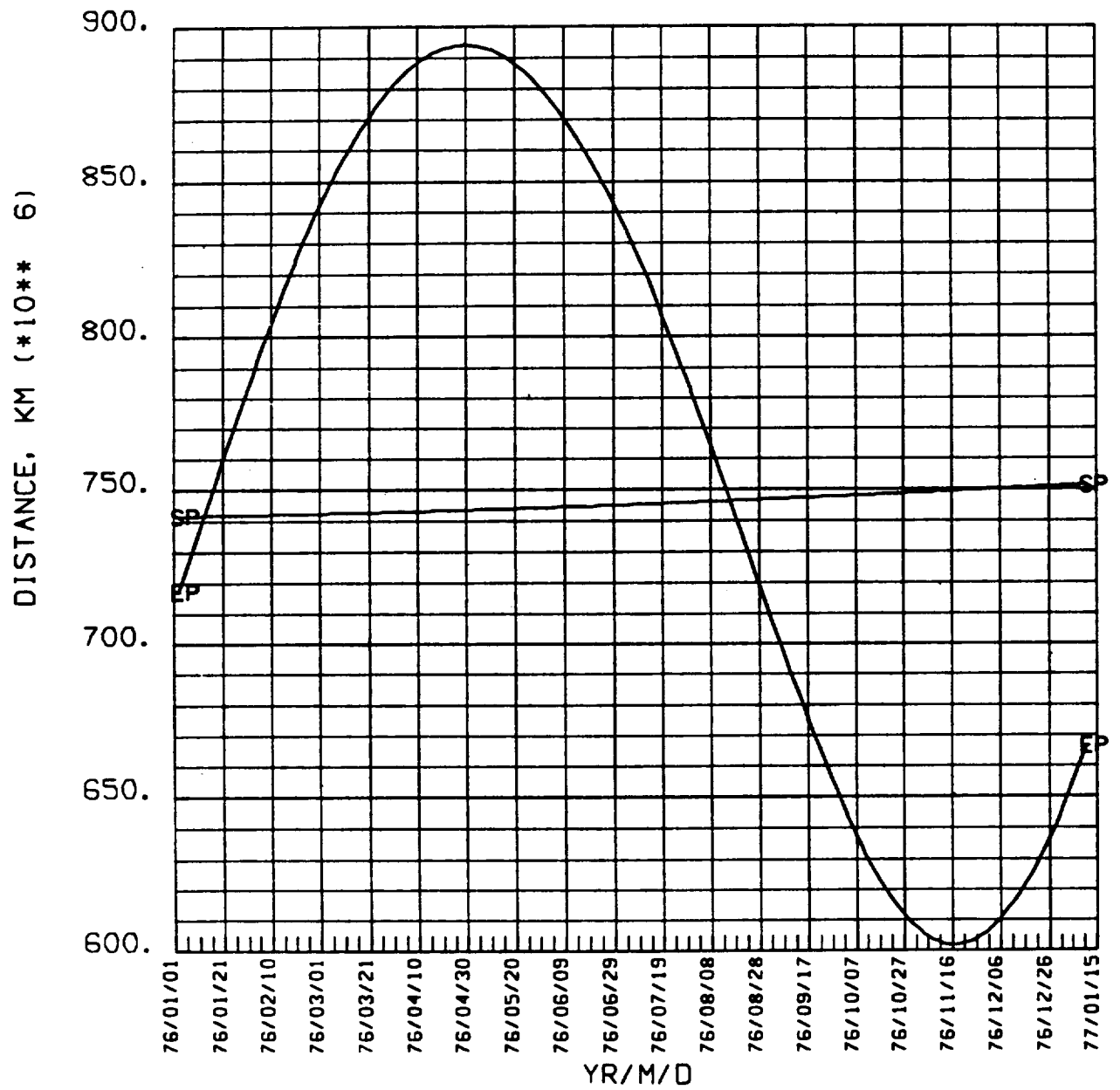
# JUPITER 1976



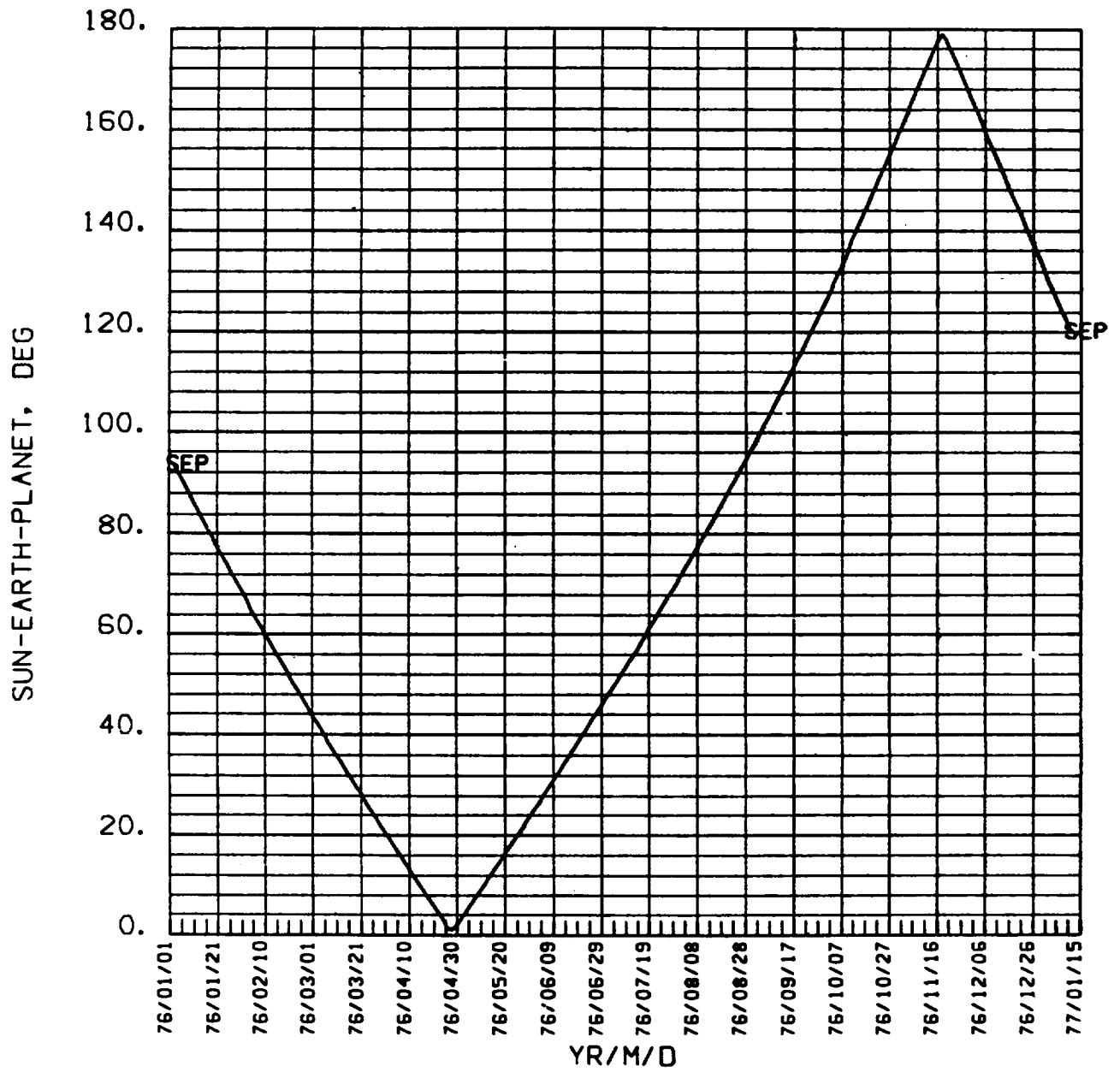
# JUPITER 1976



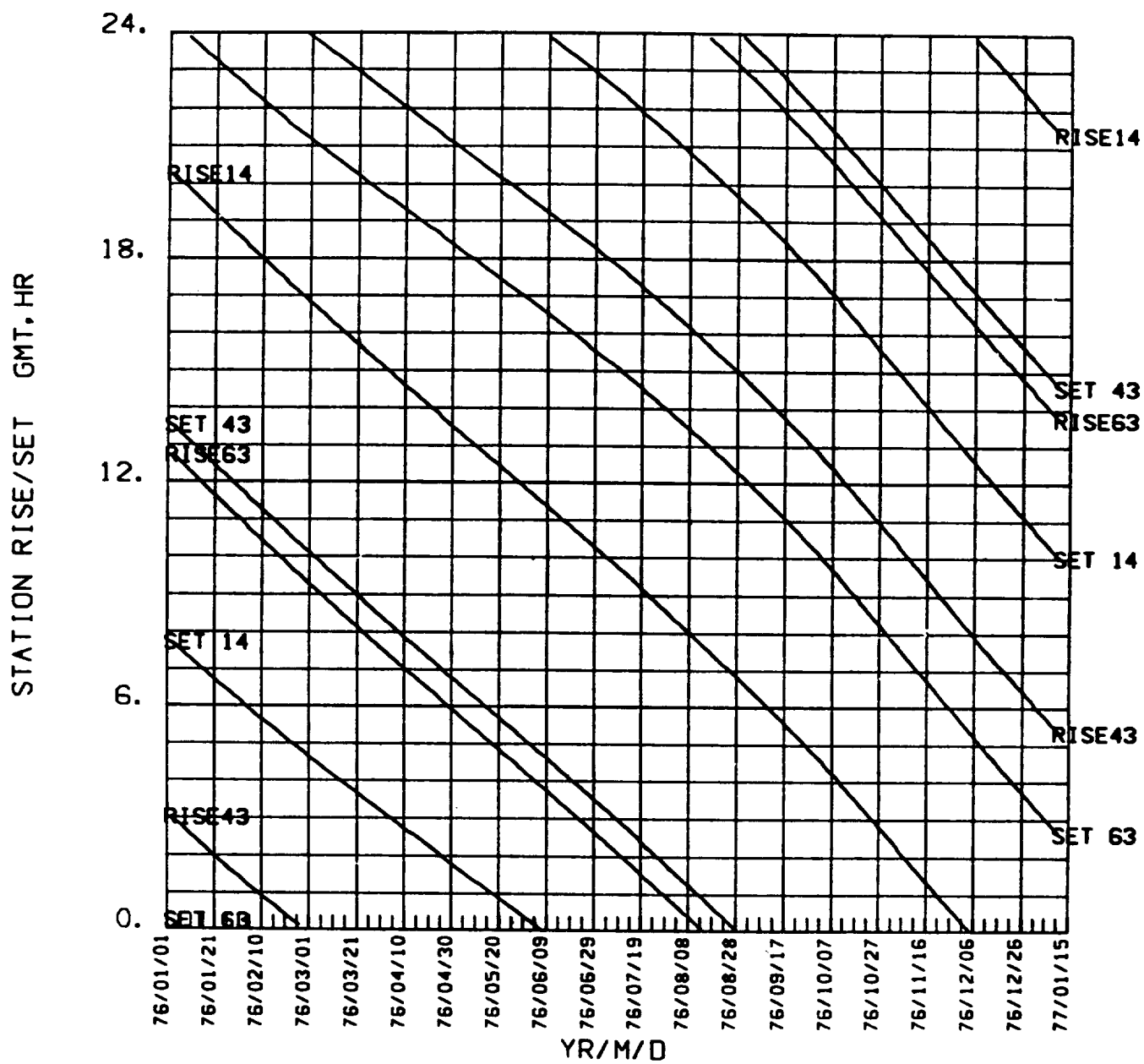
# JUPITER 1976



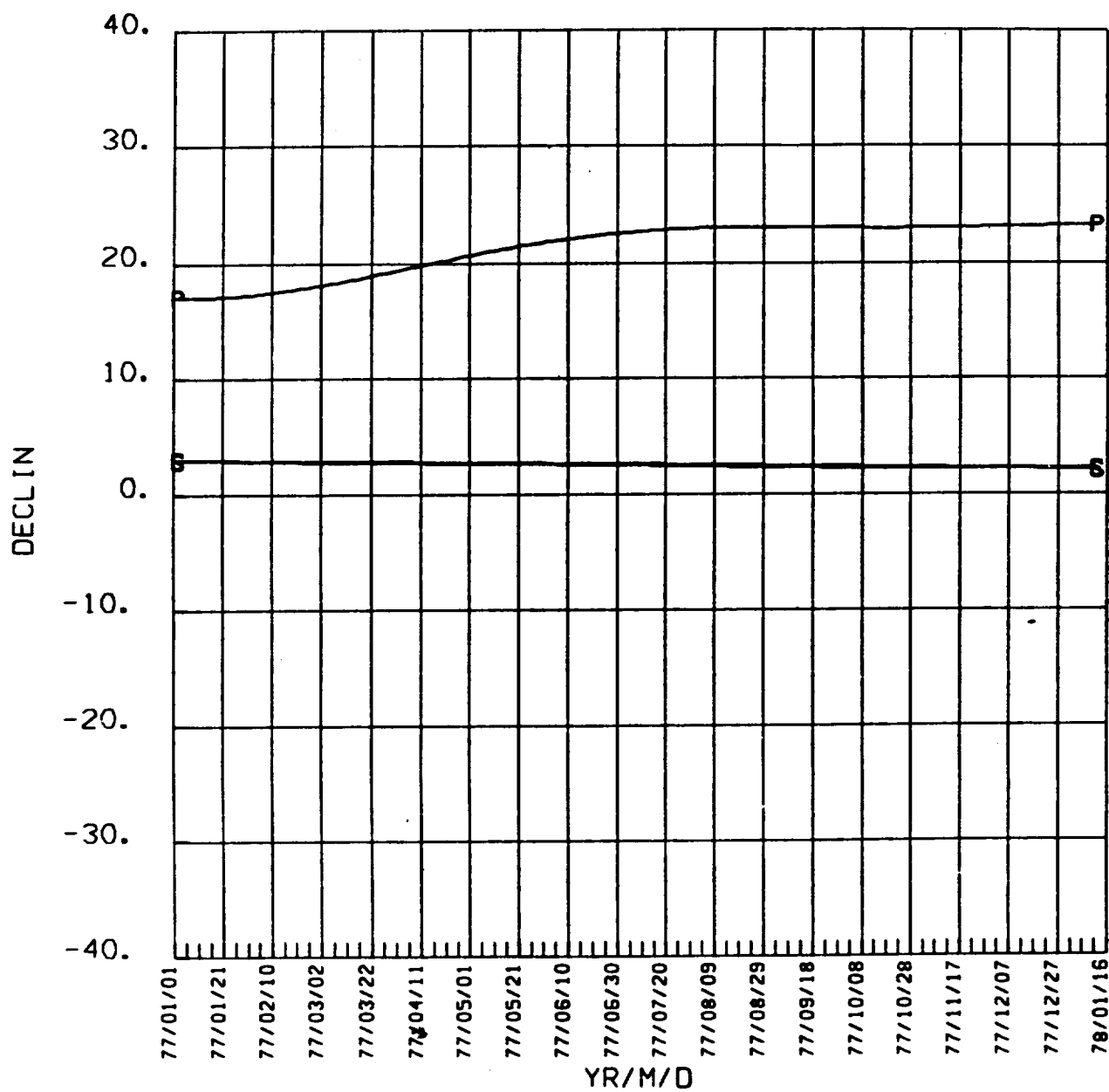
# JUPITER 1976



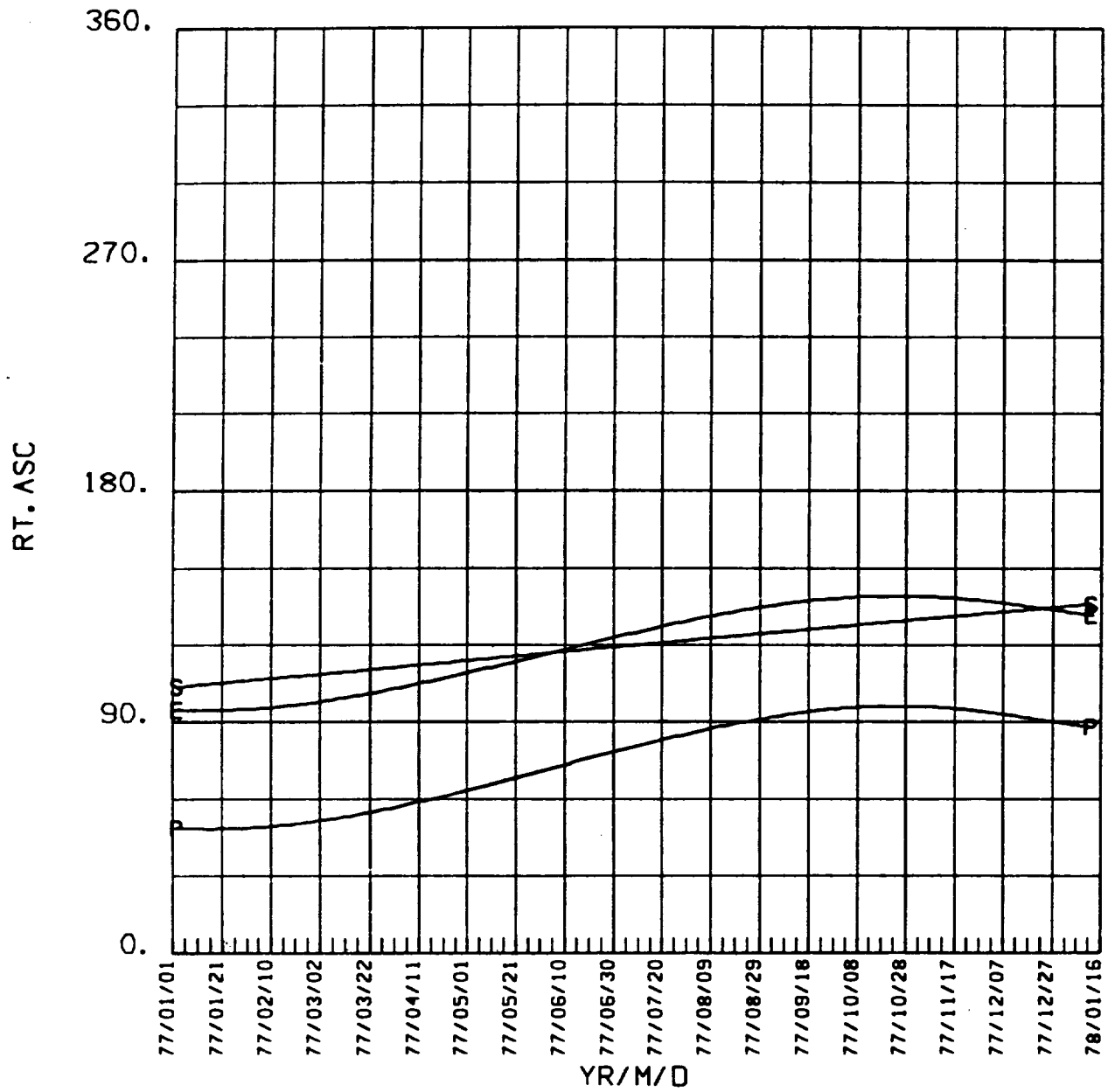
# JUPITER 1976



# JUPITER 1977

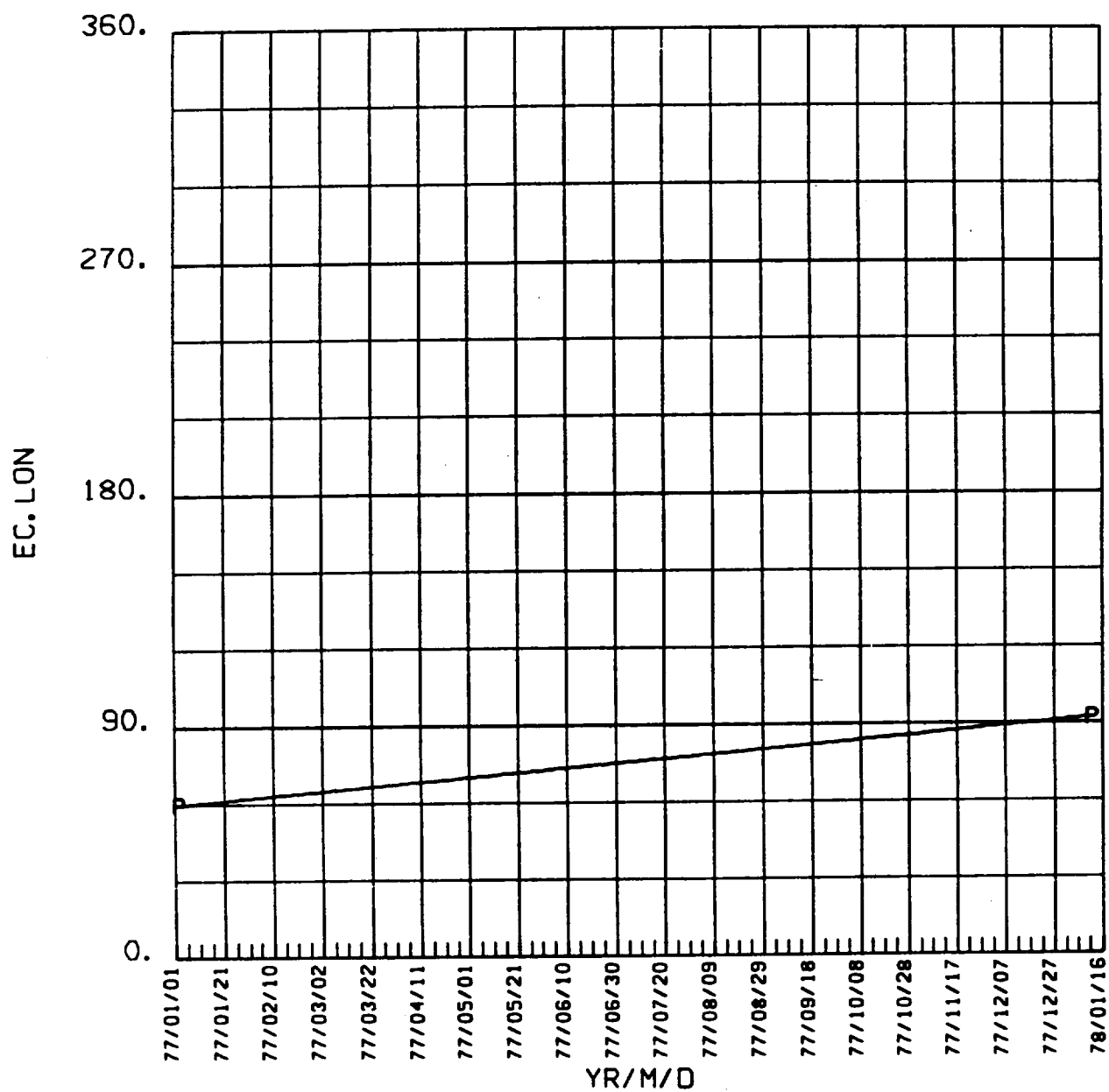


# JUPITER 1977

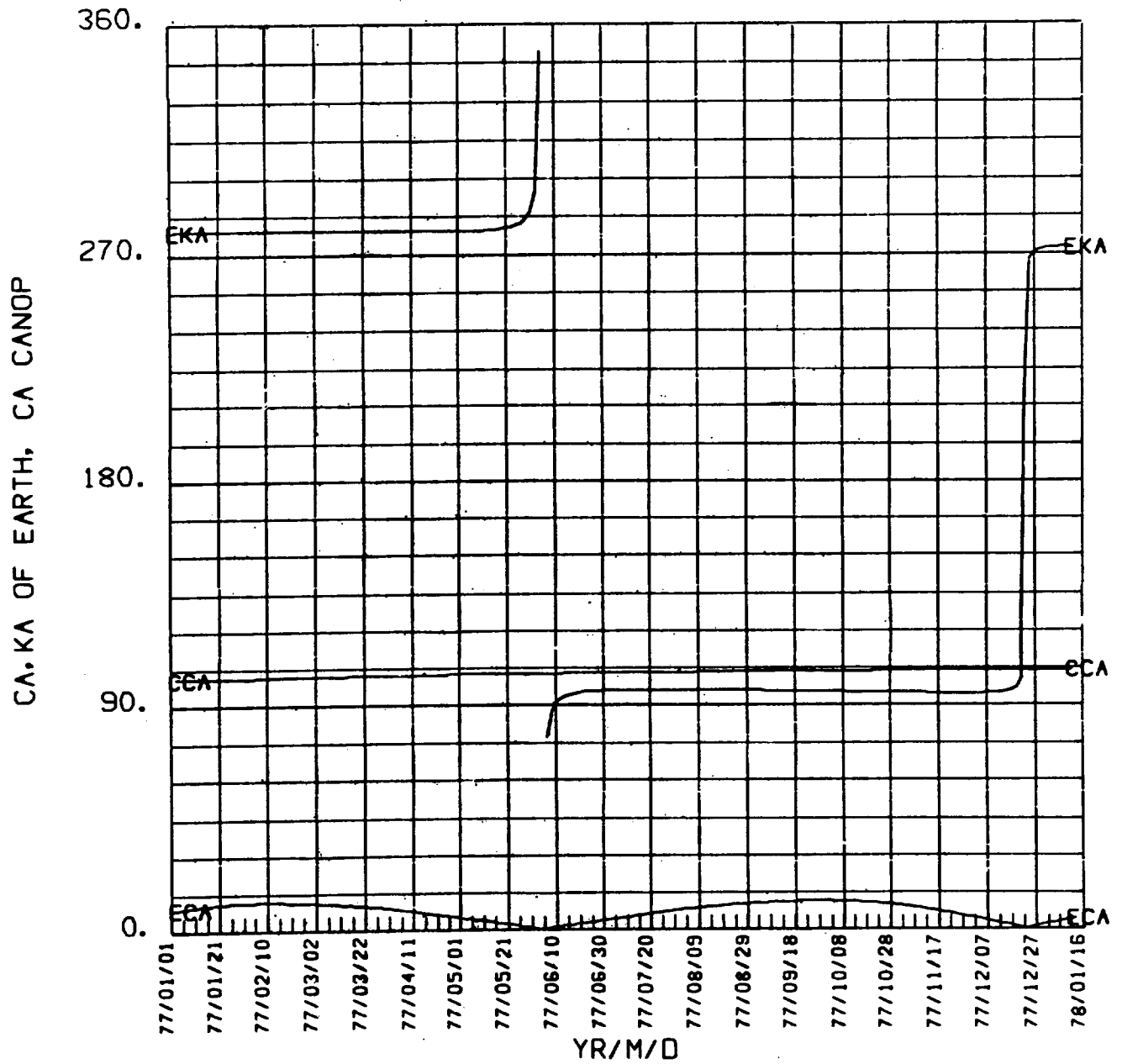




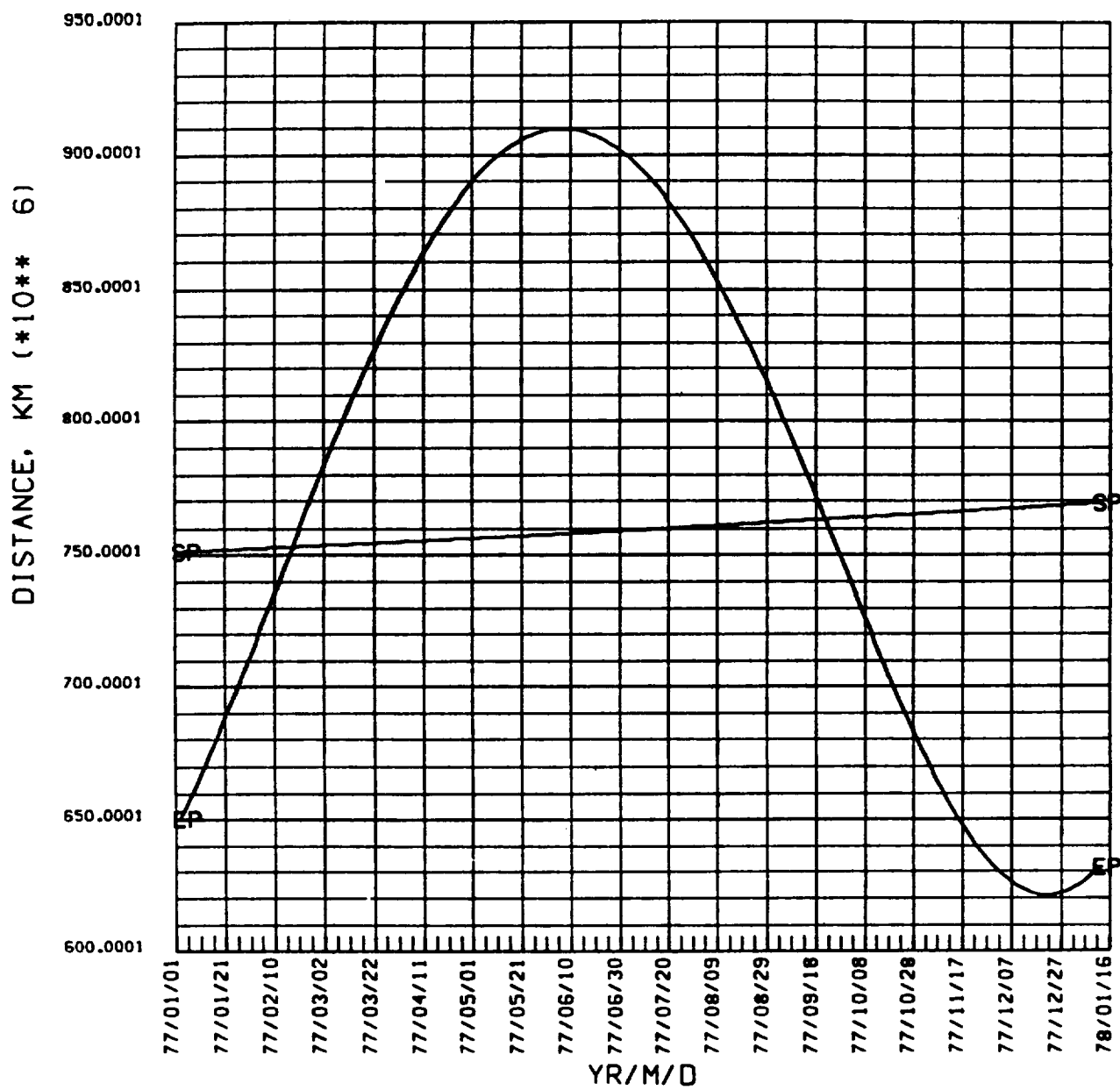
# JUPITER 1977



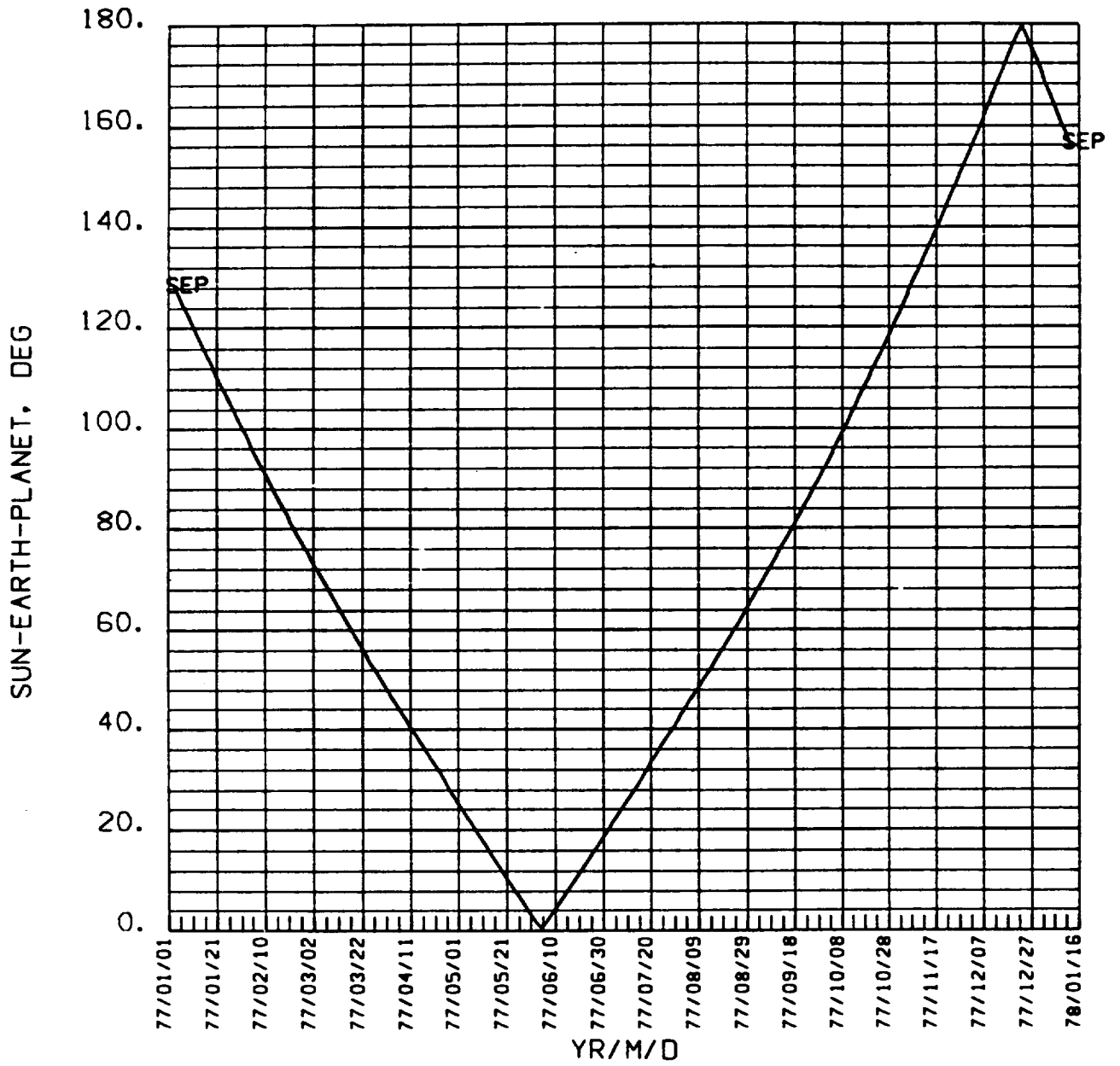
# JUPITER 1977



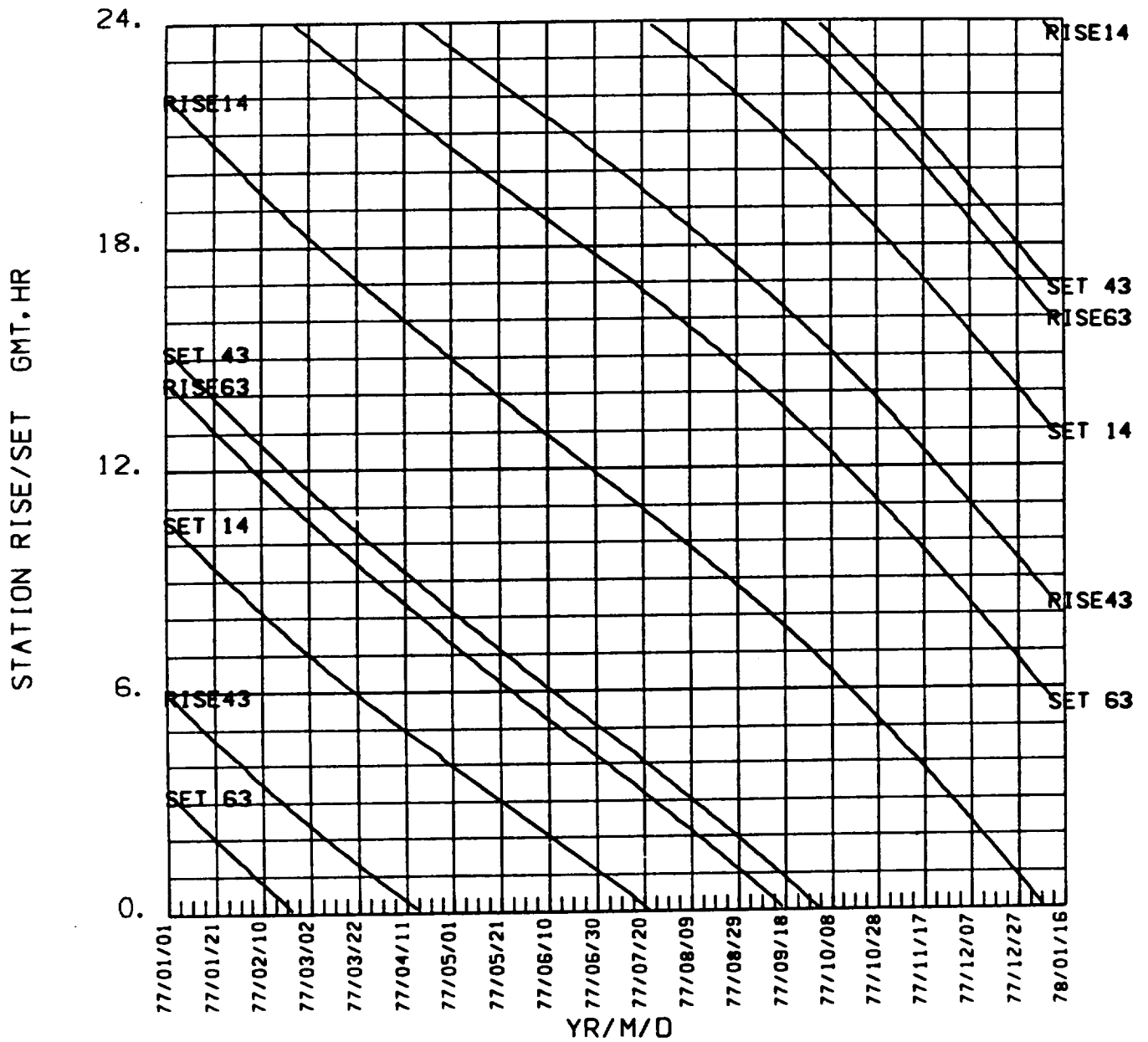
# JUPITER 1977



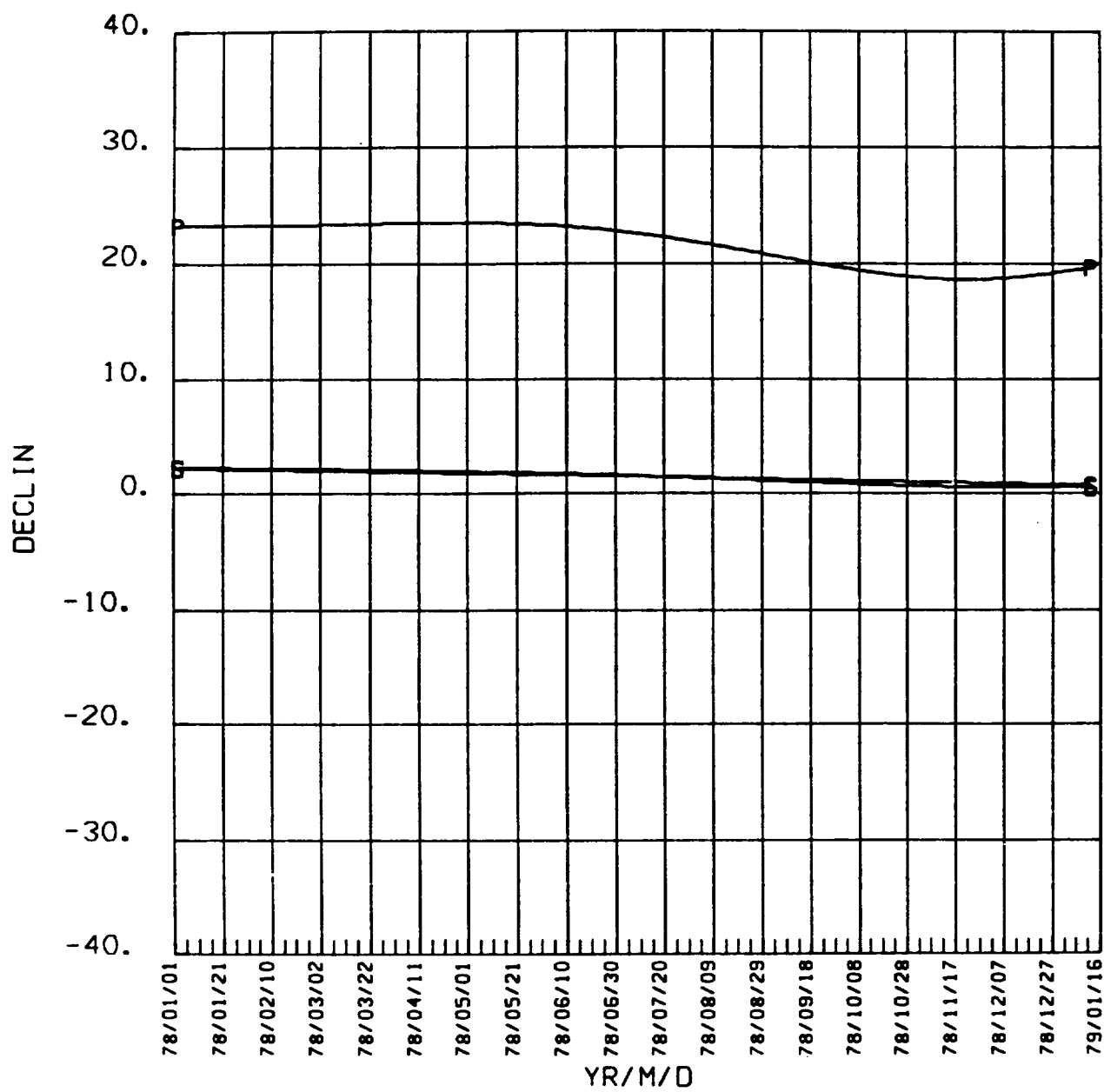
# JUPITER 1977



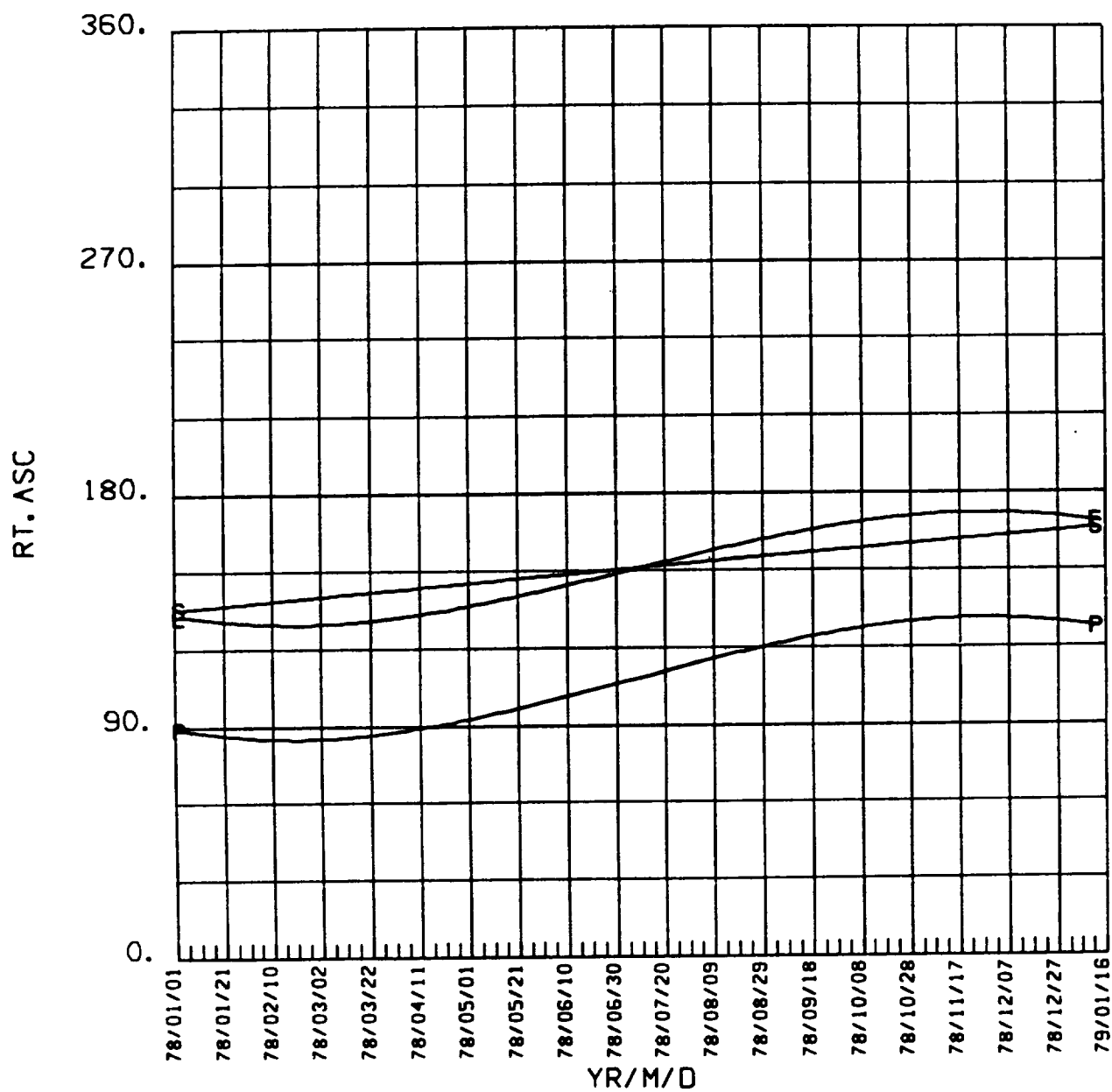
# JUPITER 1977



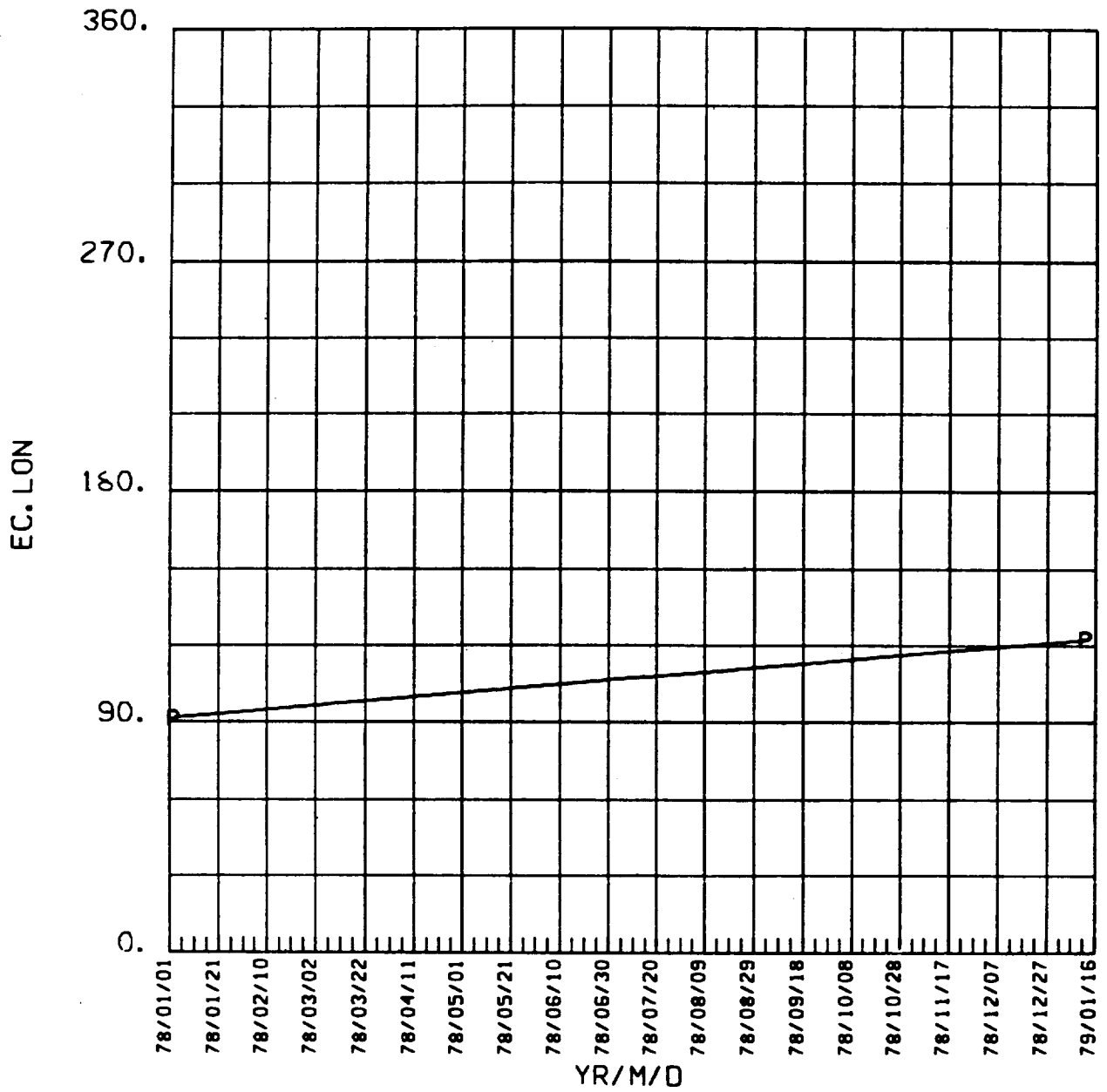
# JUPITER 1978



# JUPITER 1978

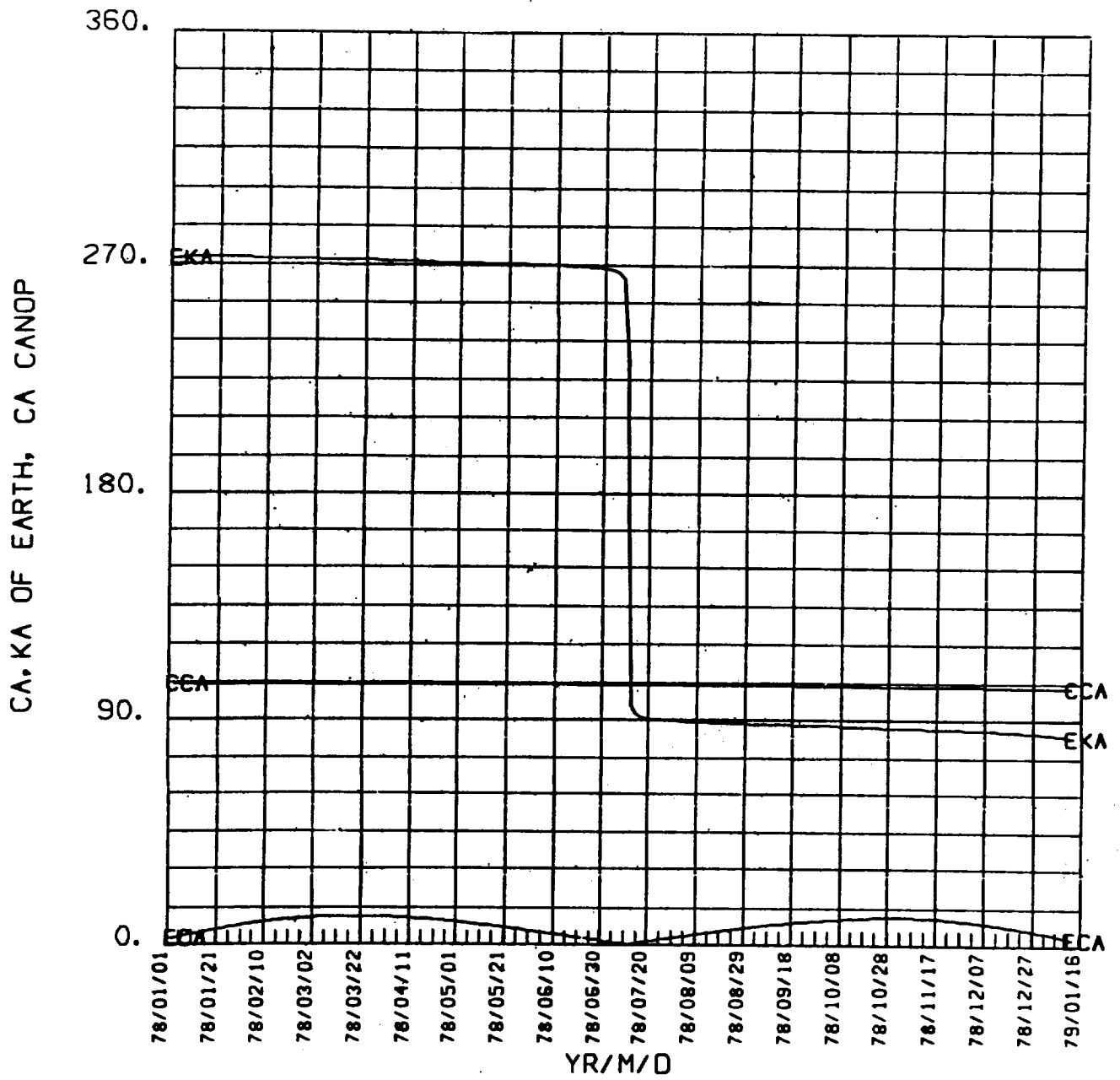


# JUPITER 1978

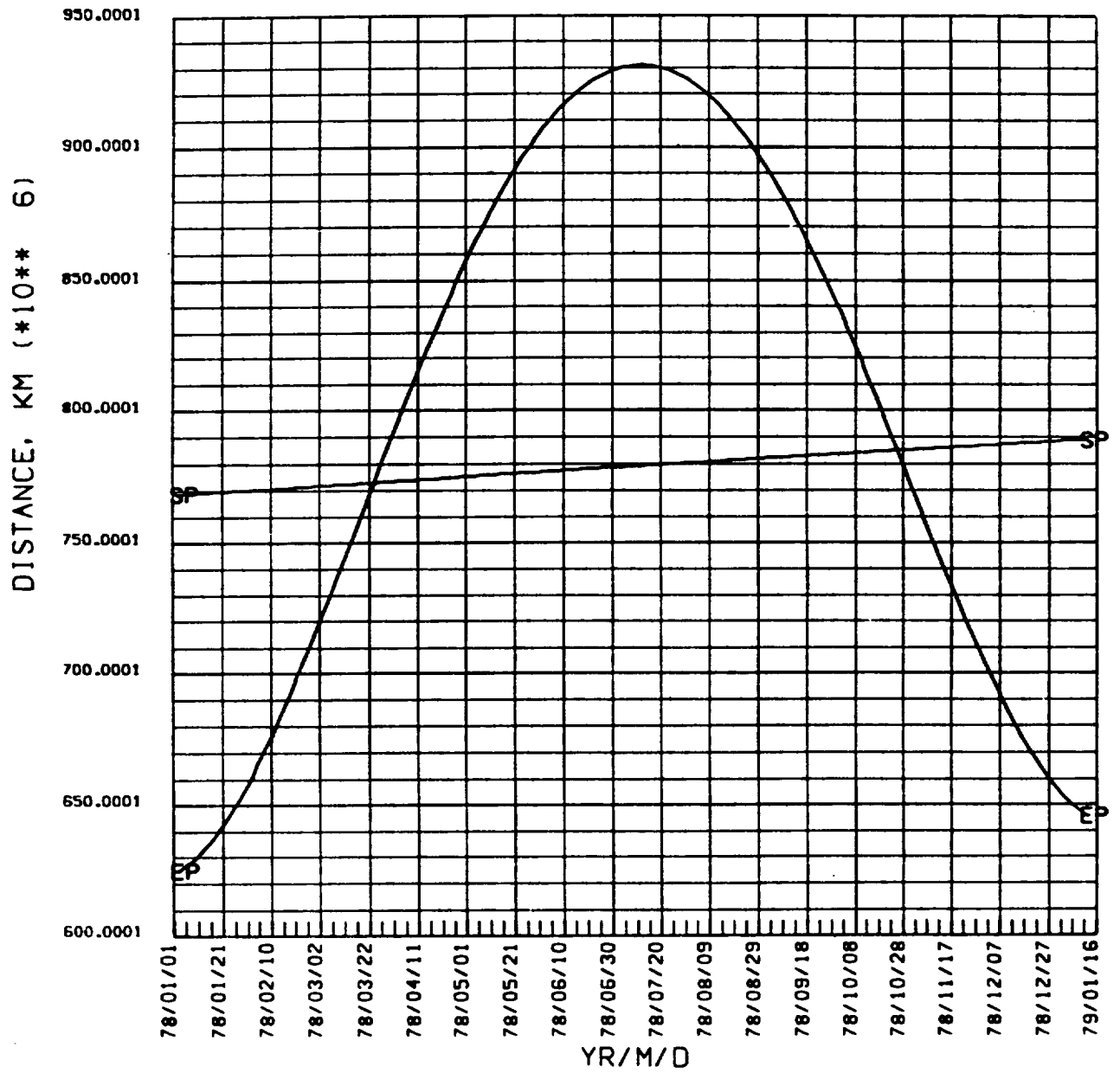




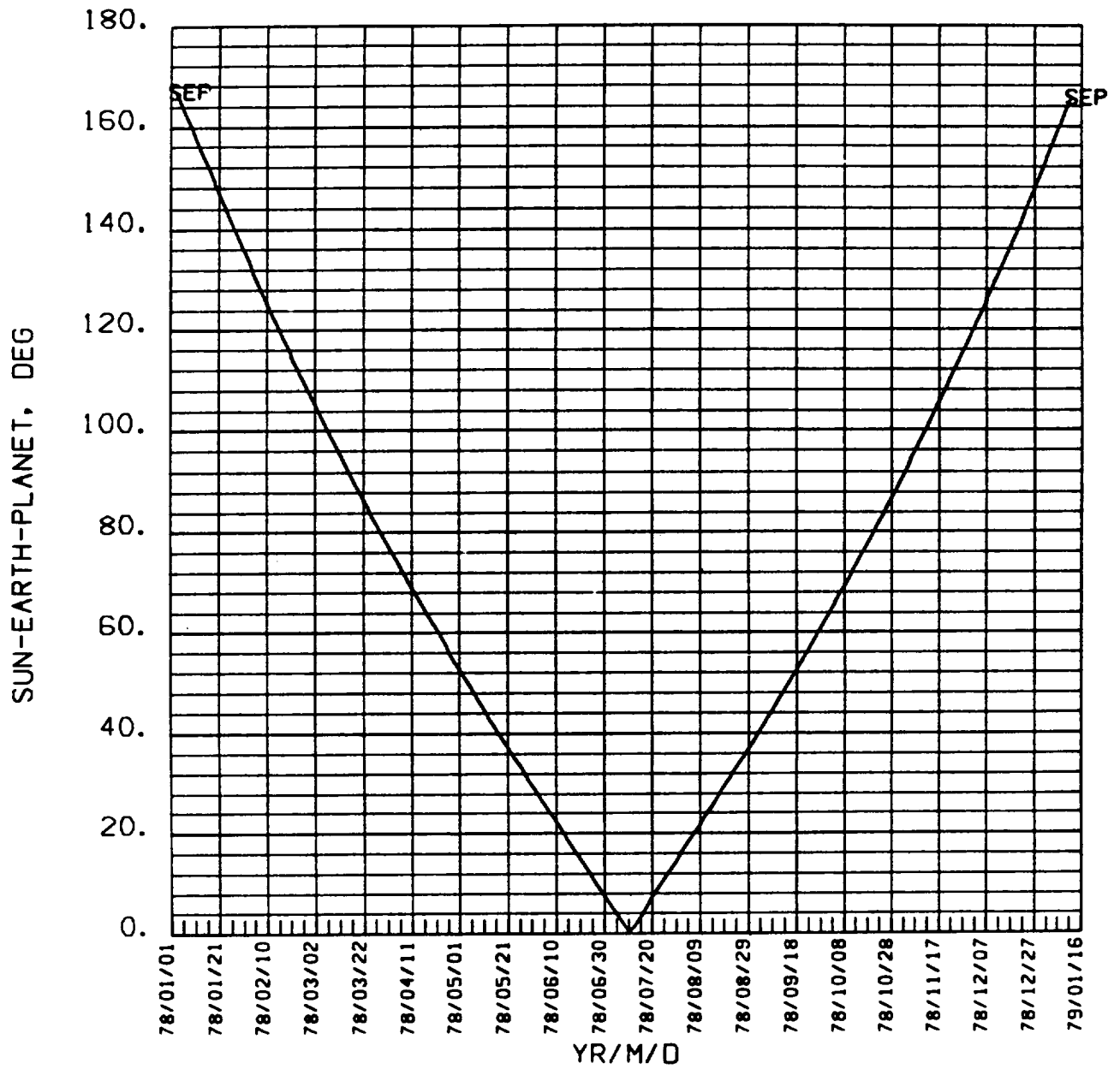
# JUPITER 1978



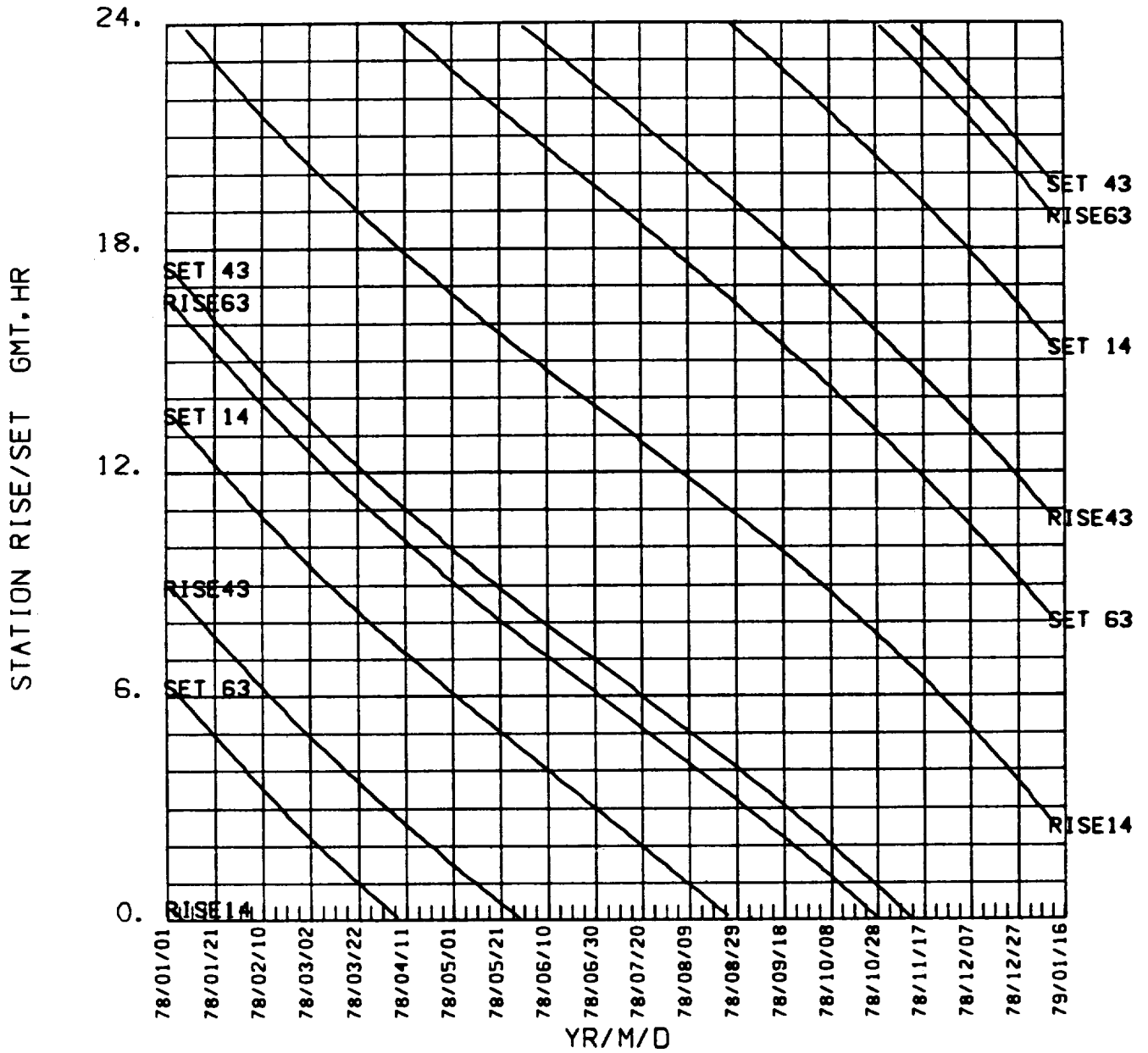
# JUPITER 1978



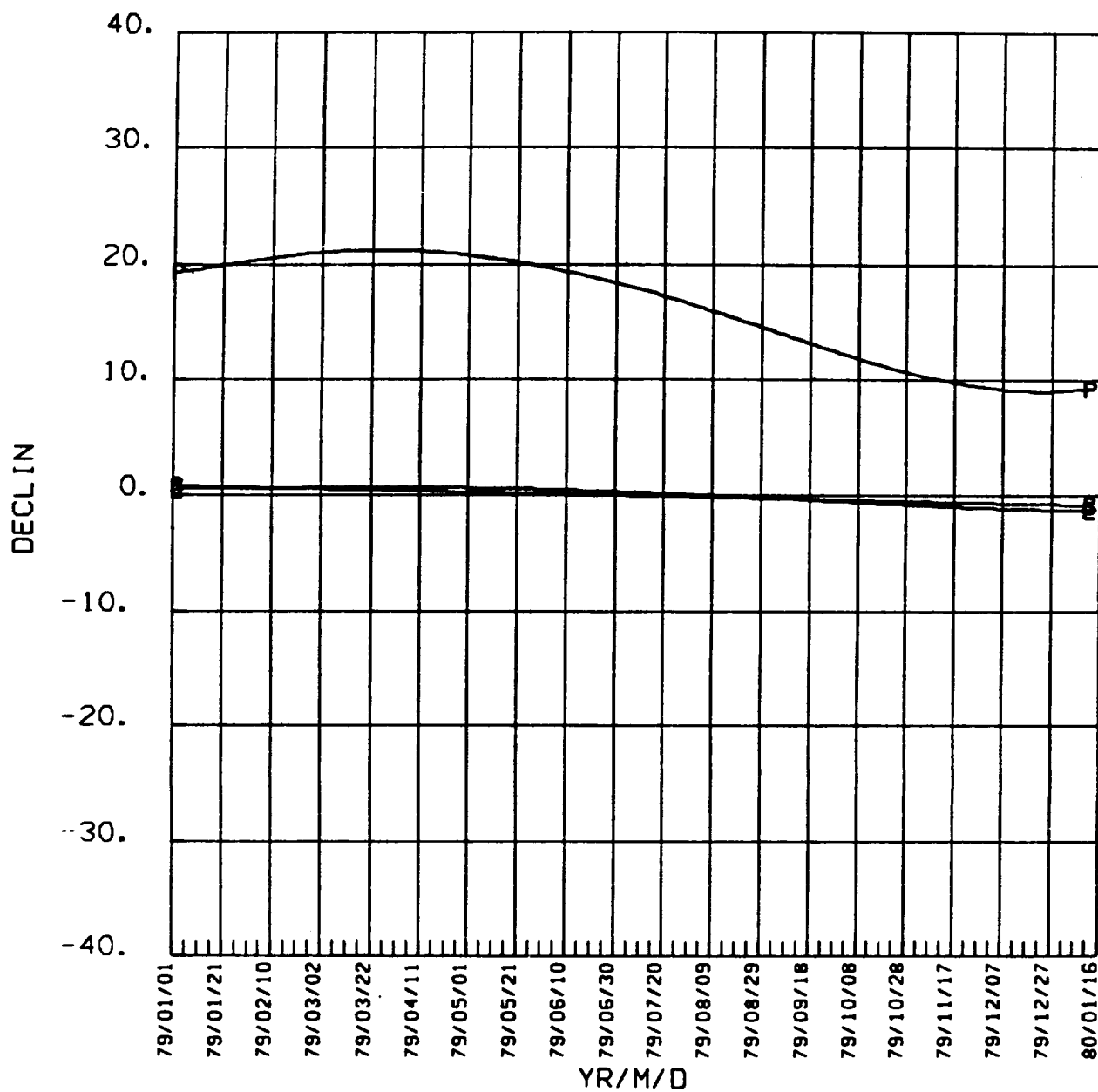
# JUPITER 1978



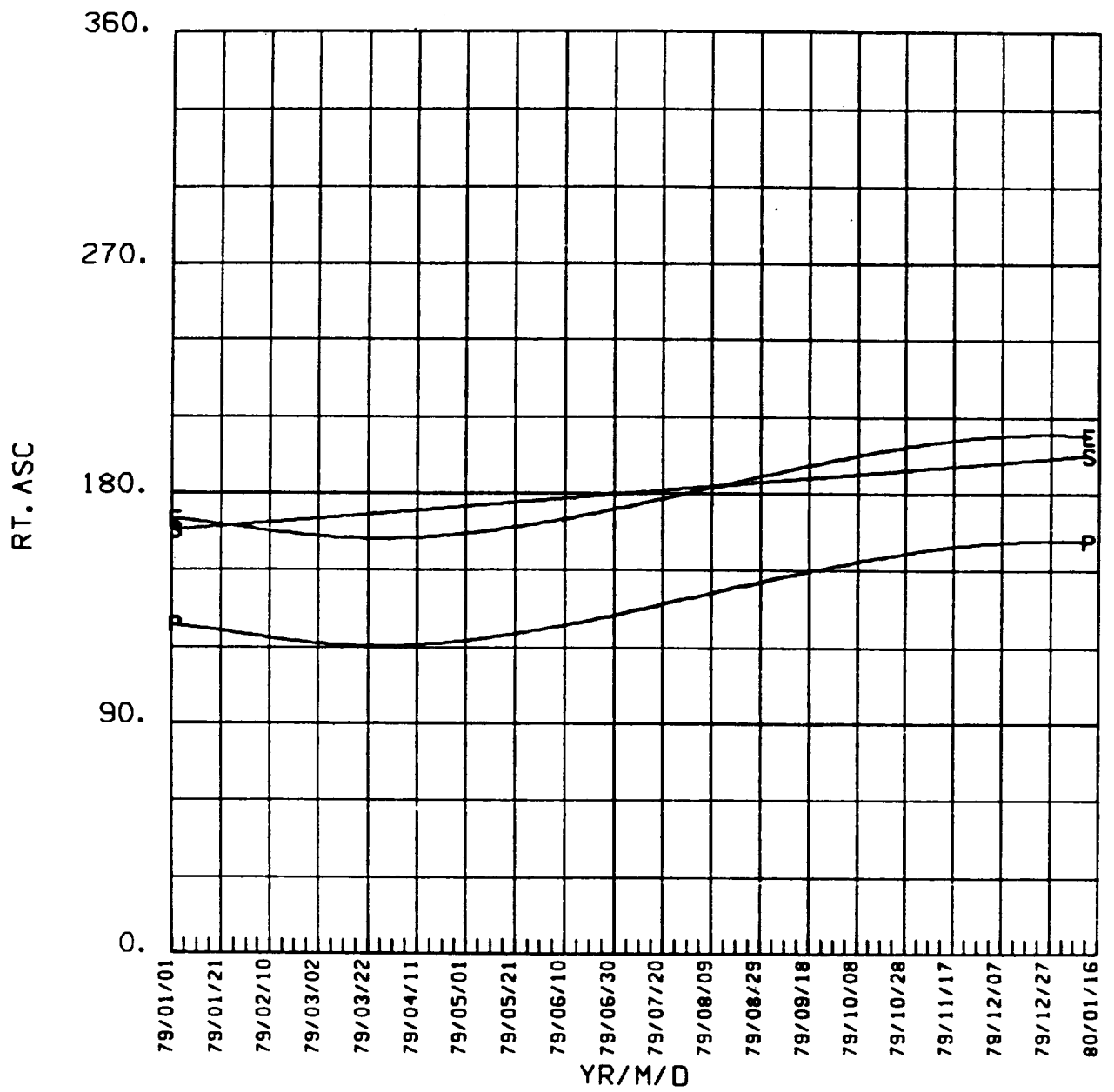
# JUPITER 1978



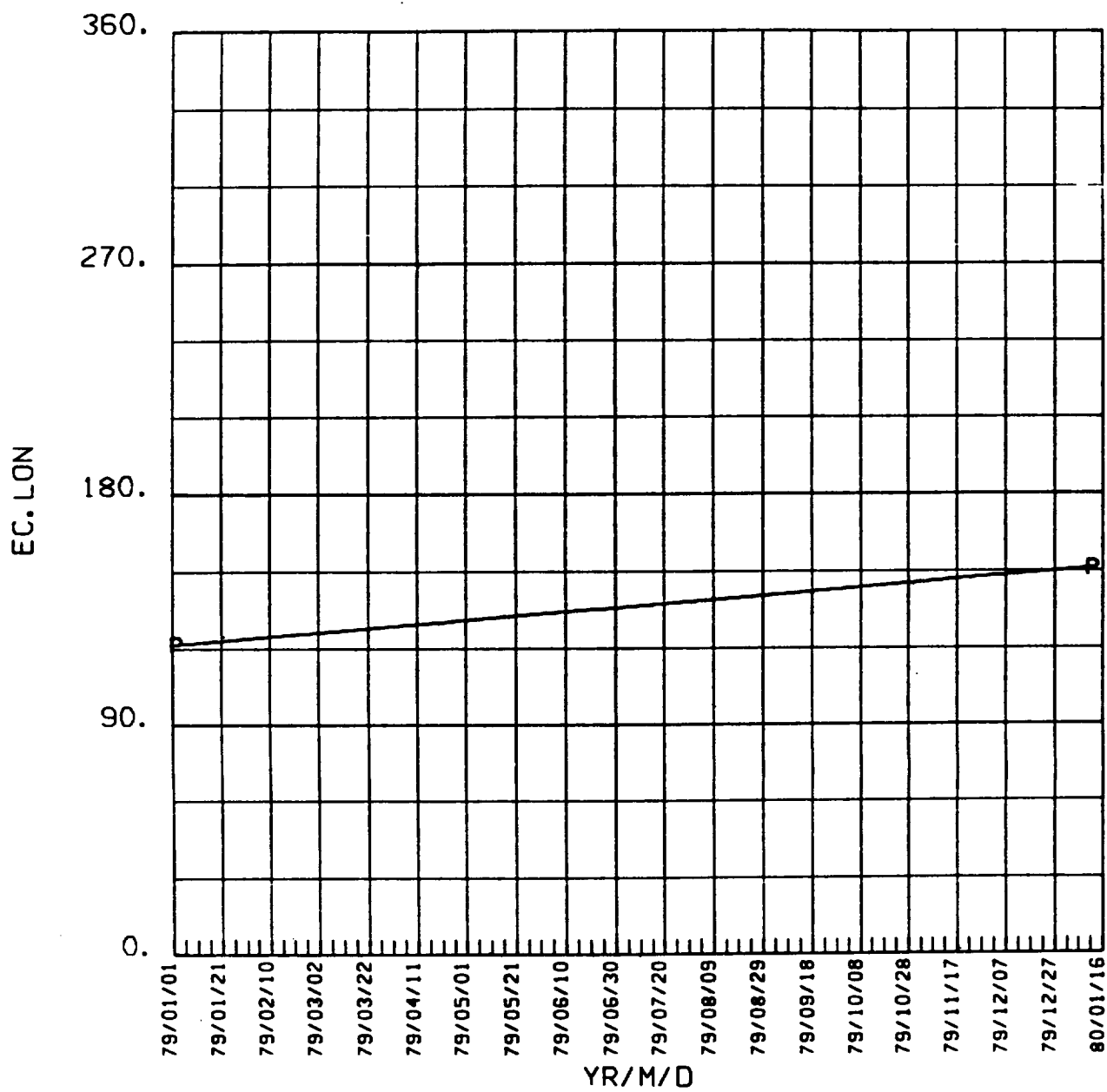
# JUPITER 1979



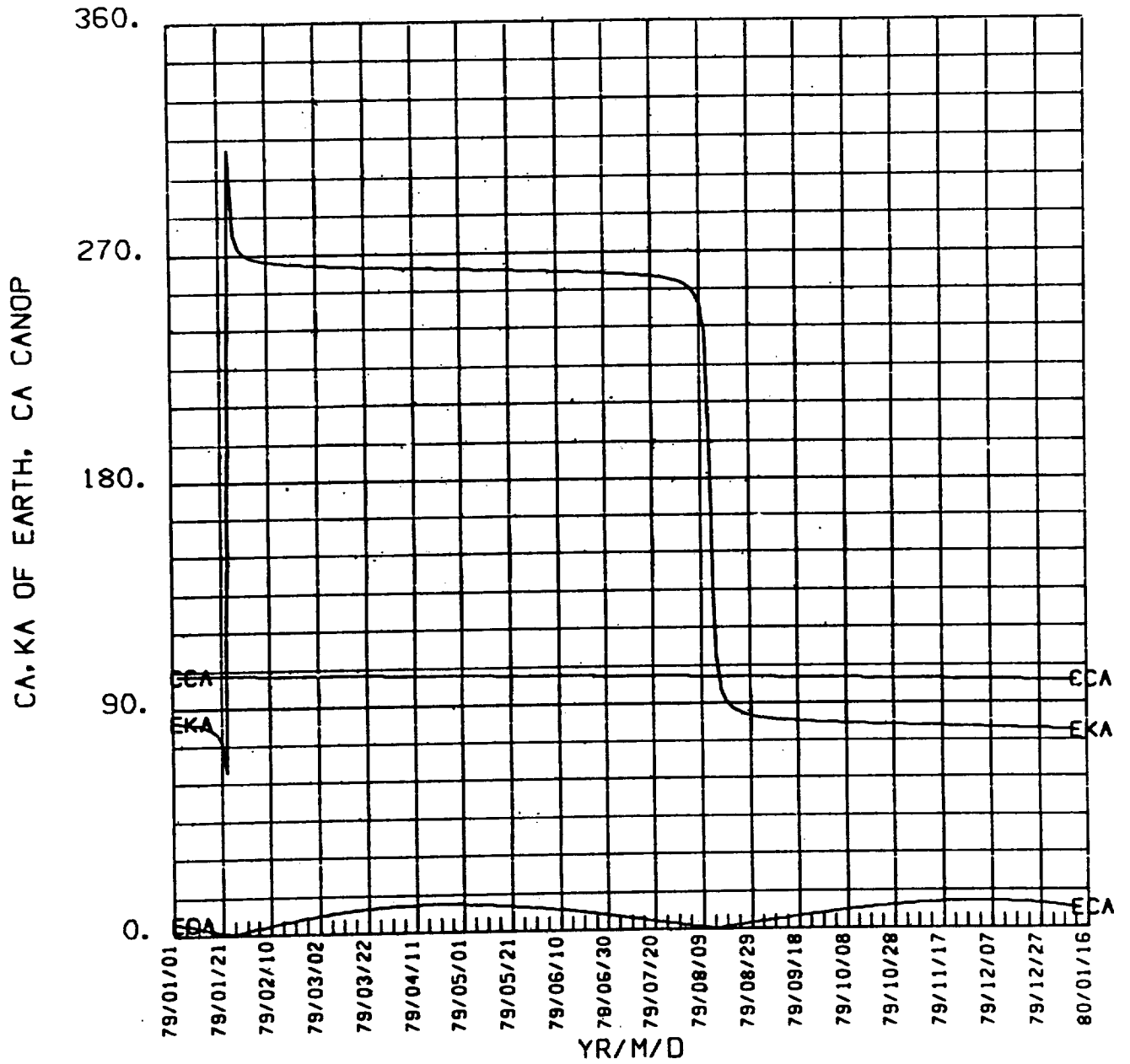
# JUPITER 1979



# JUPITER 1979

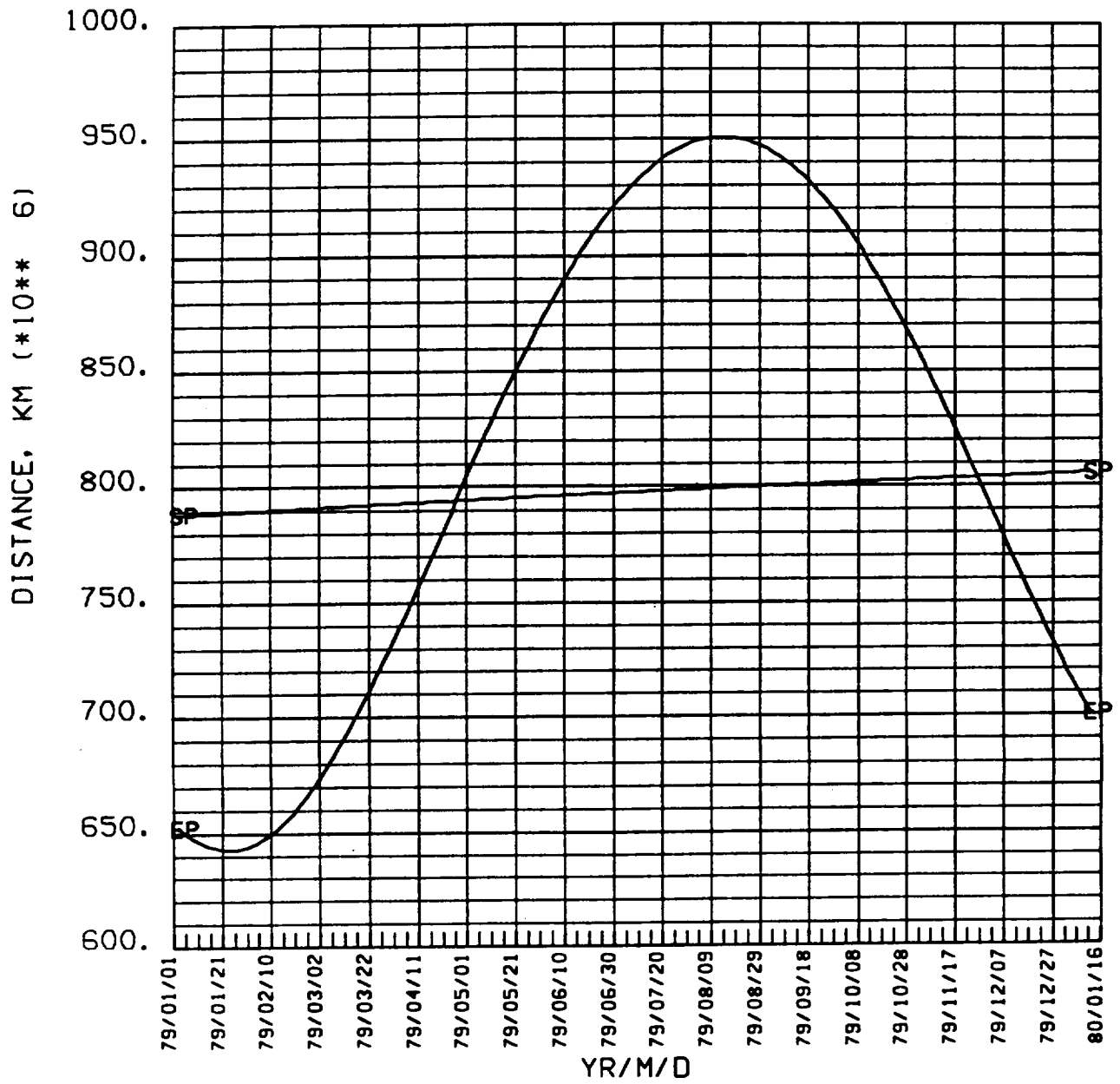


# JUPITER 1979

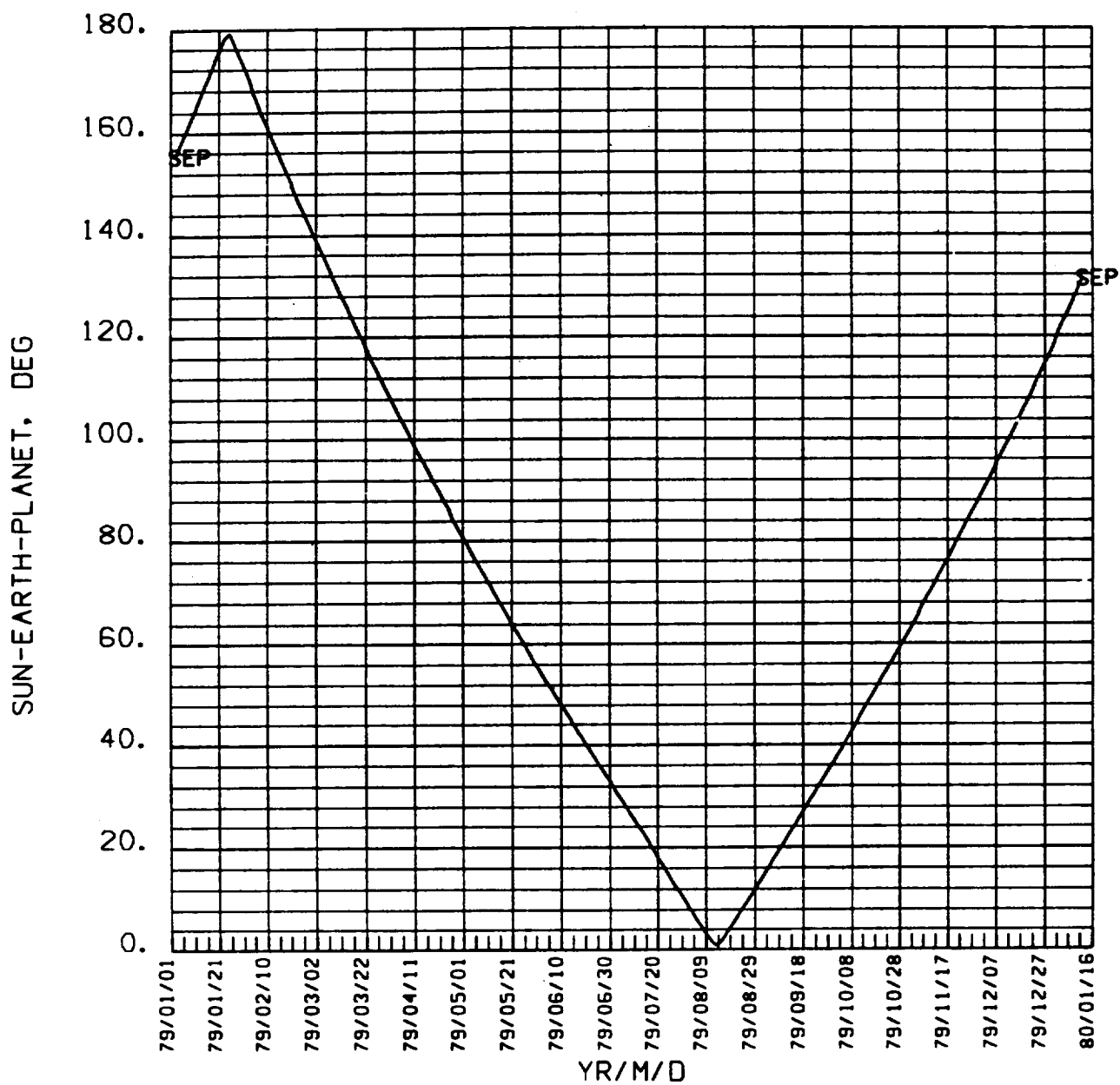




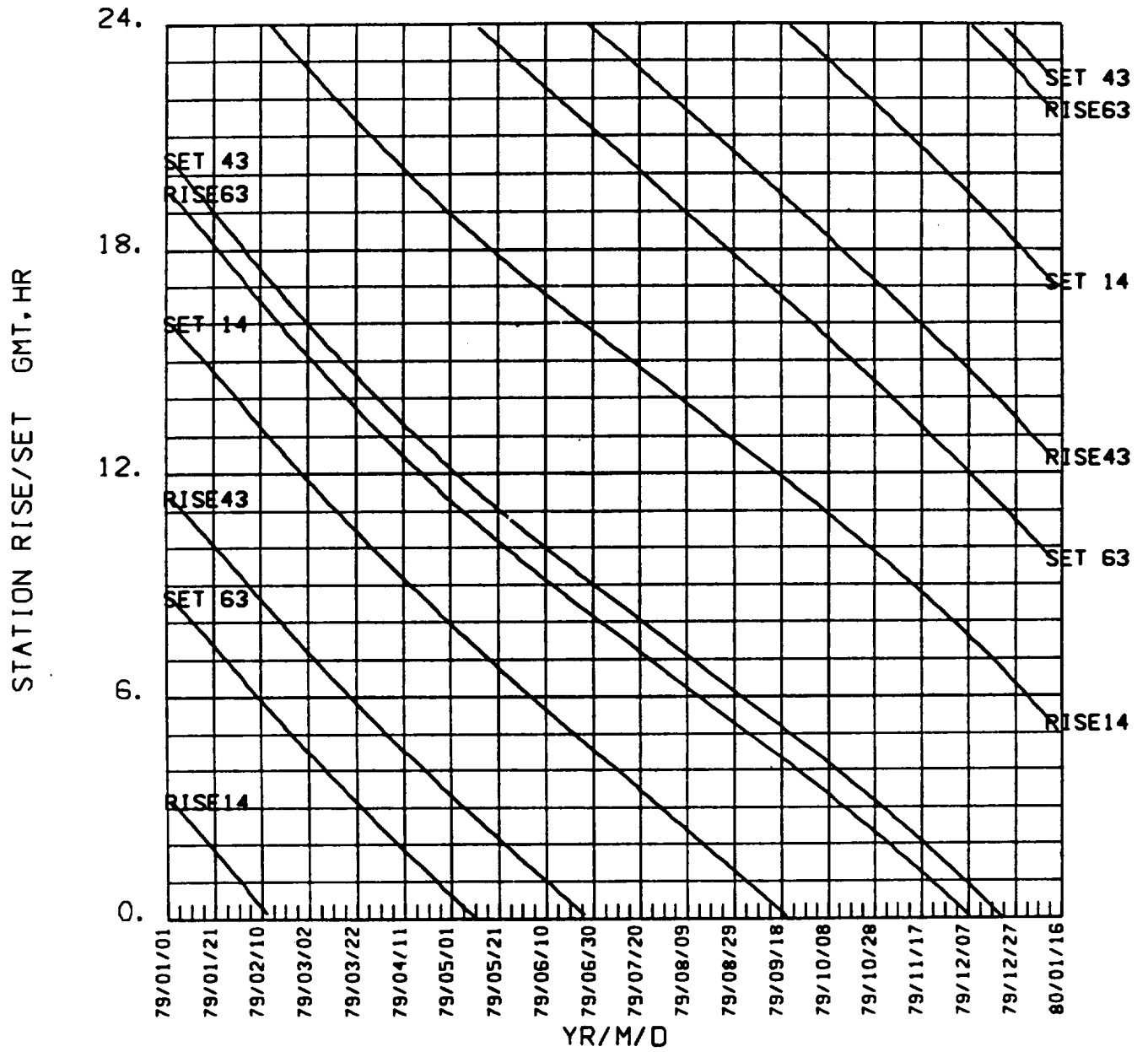
# JUPITER 1979



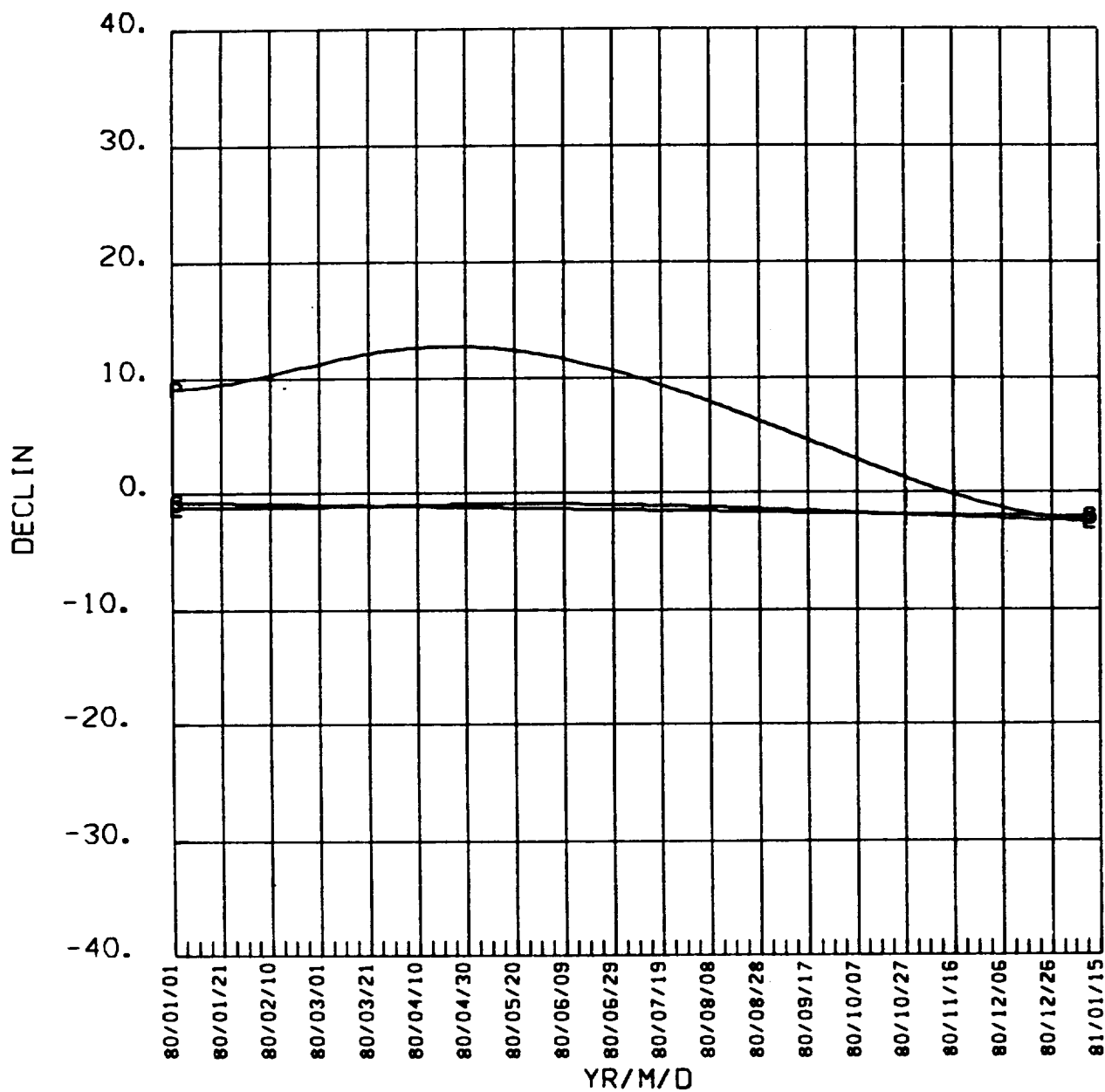
# JUPITER 1979



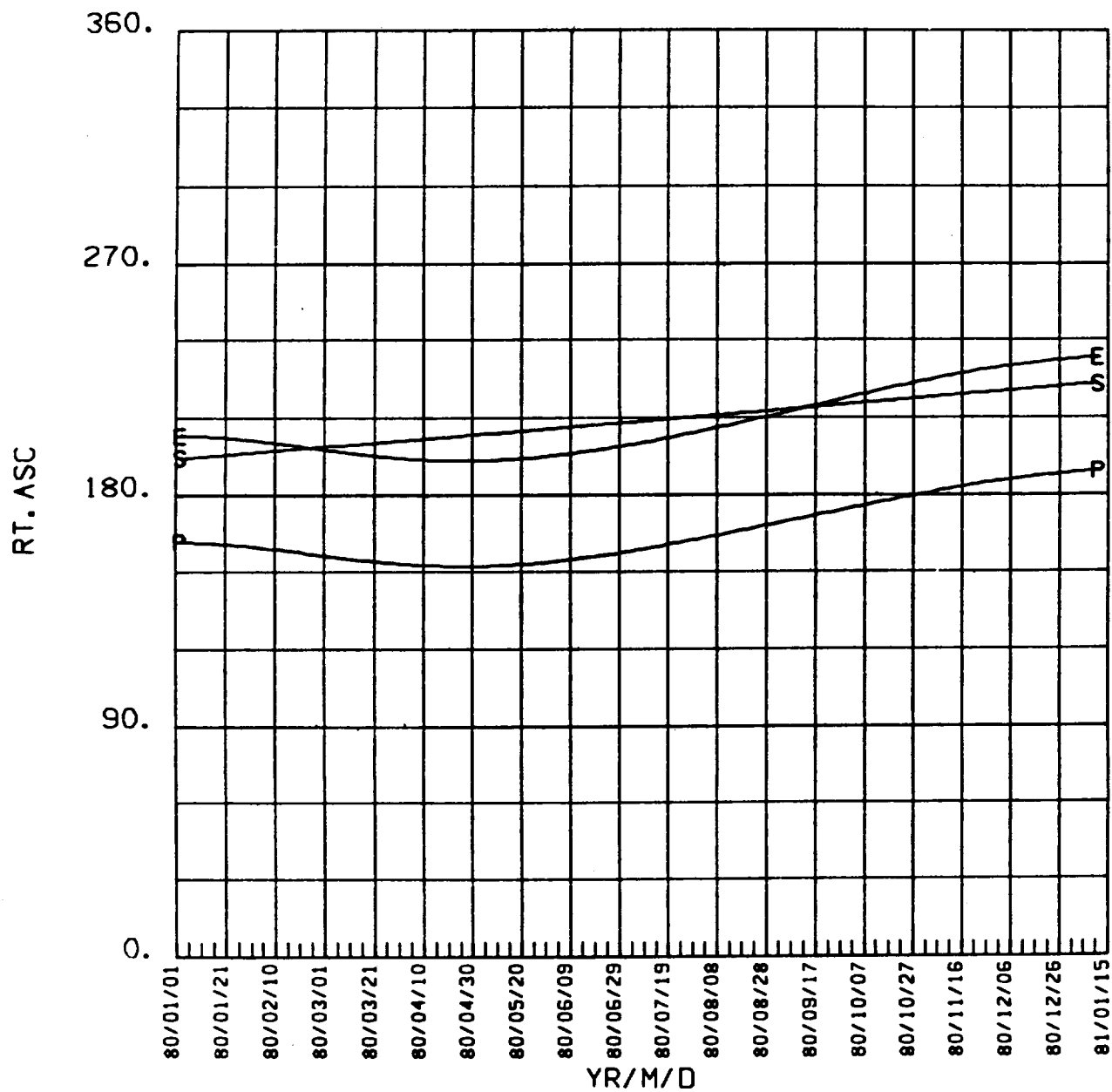
# JUPITER 1979



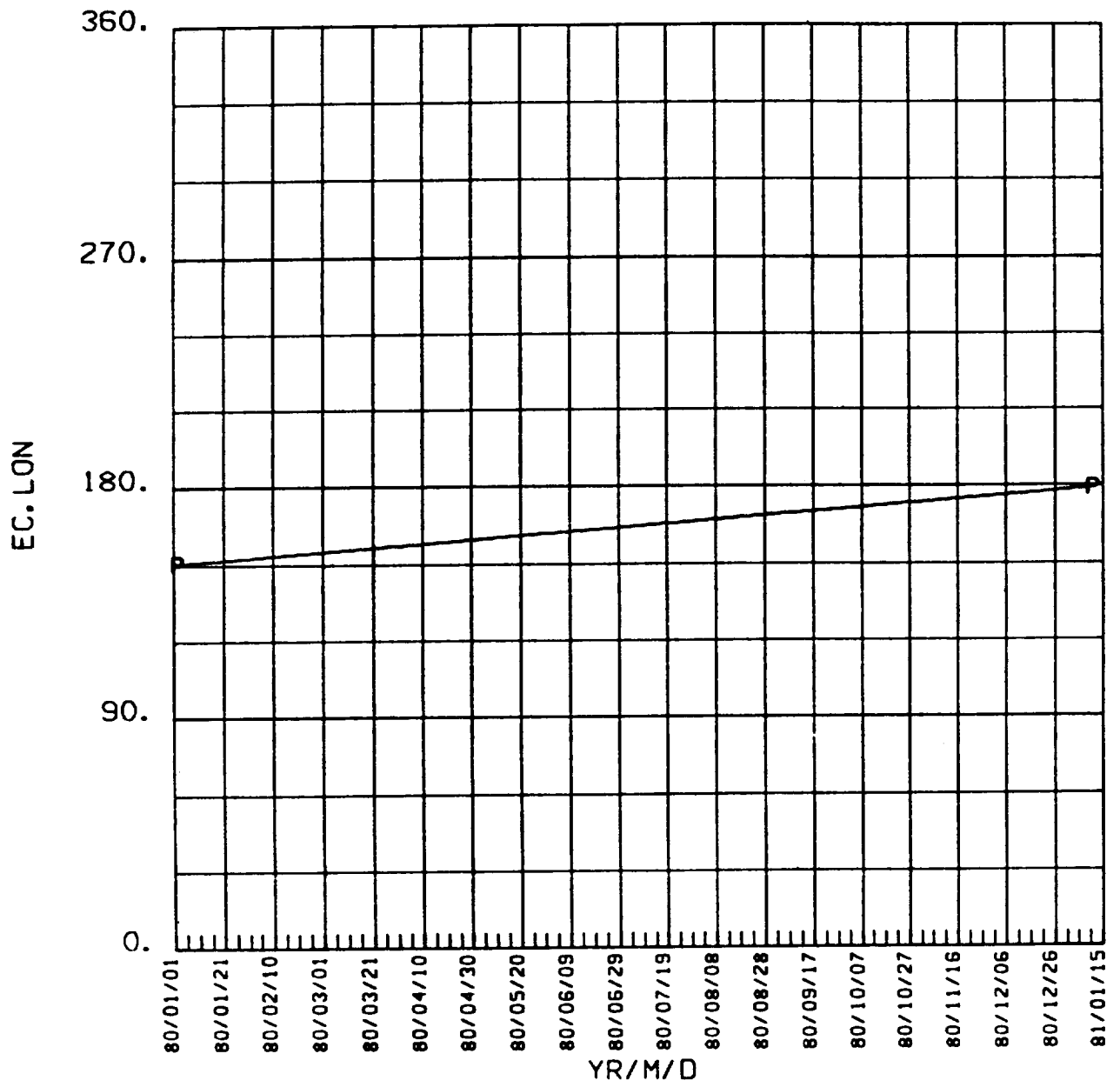
# JUPITER 1980



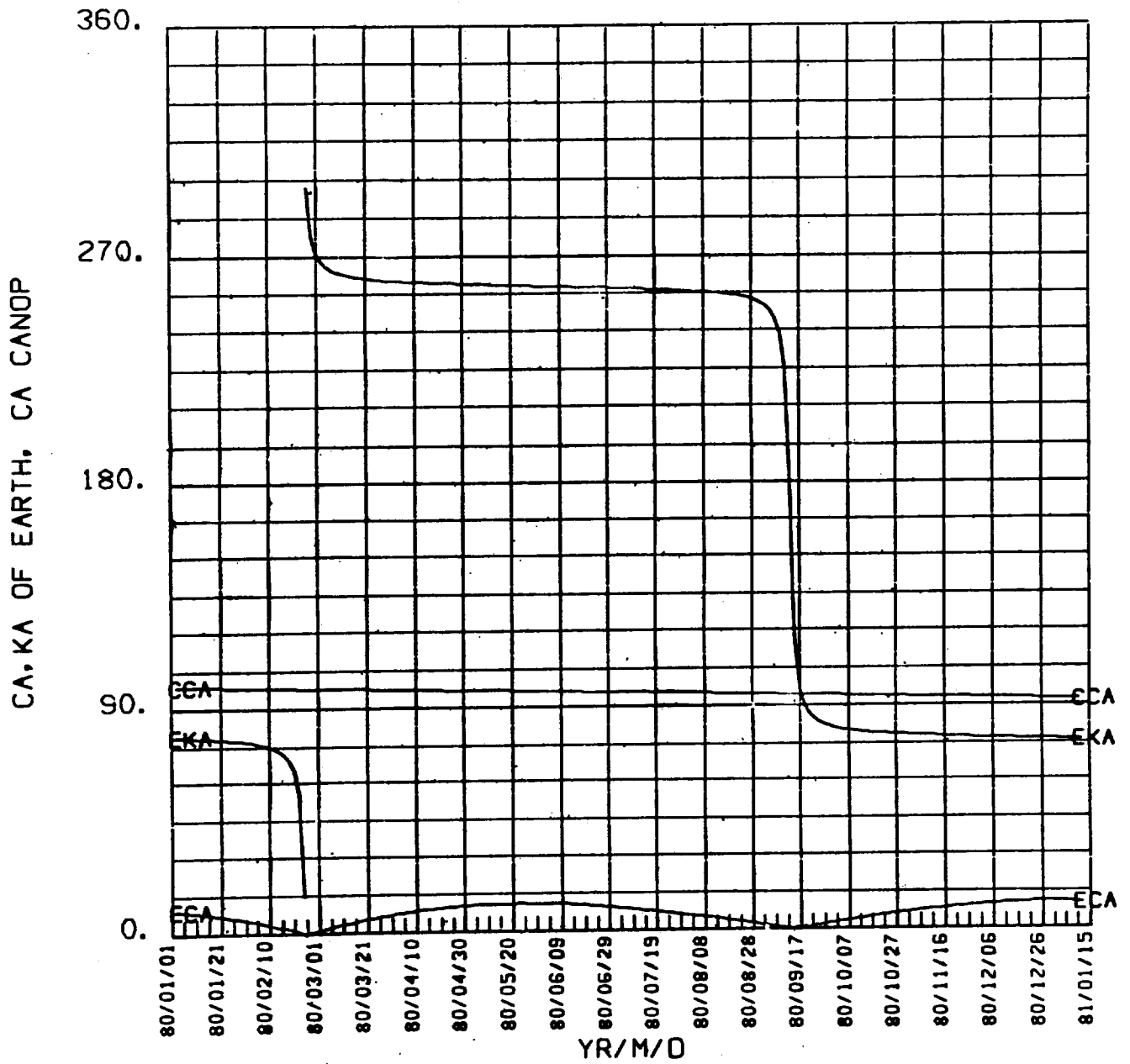
# JUPITER 1980



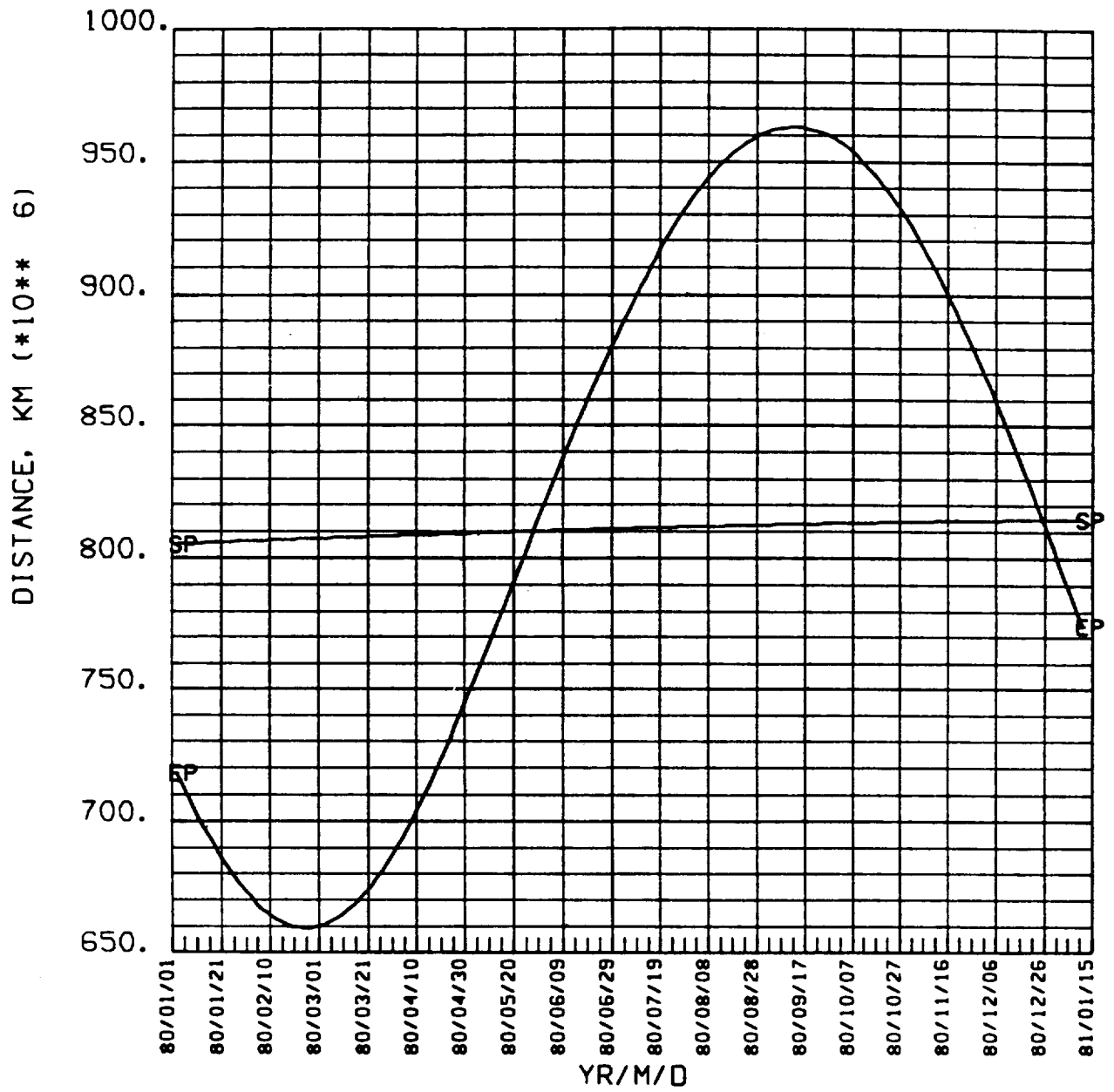
JUPITER 1980



# JUPITER 1980

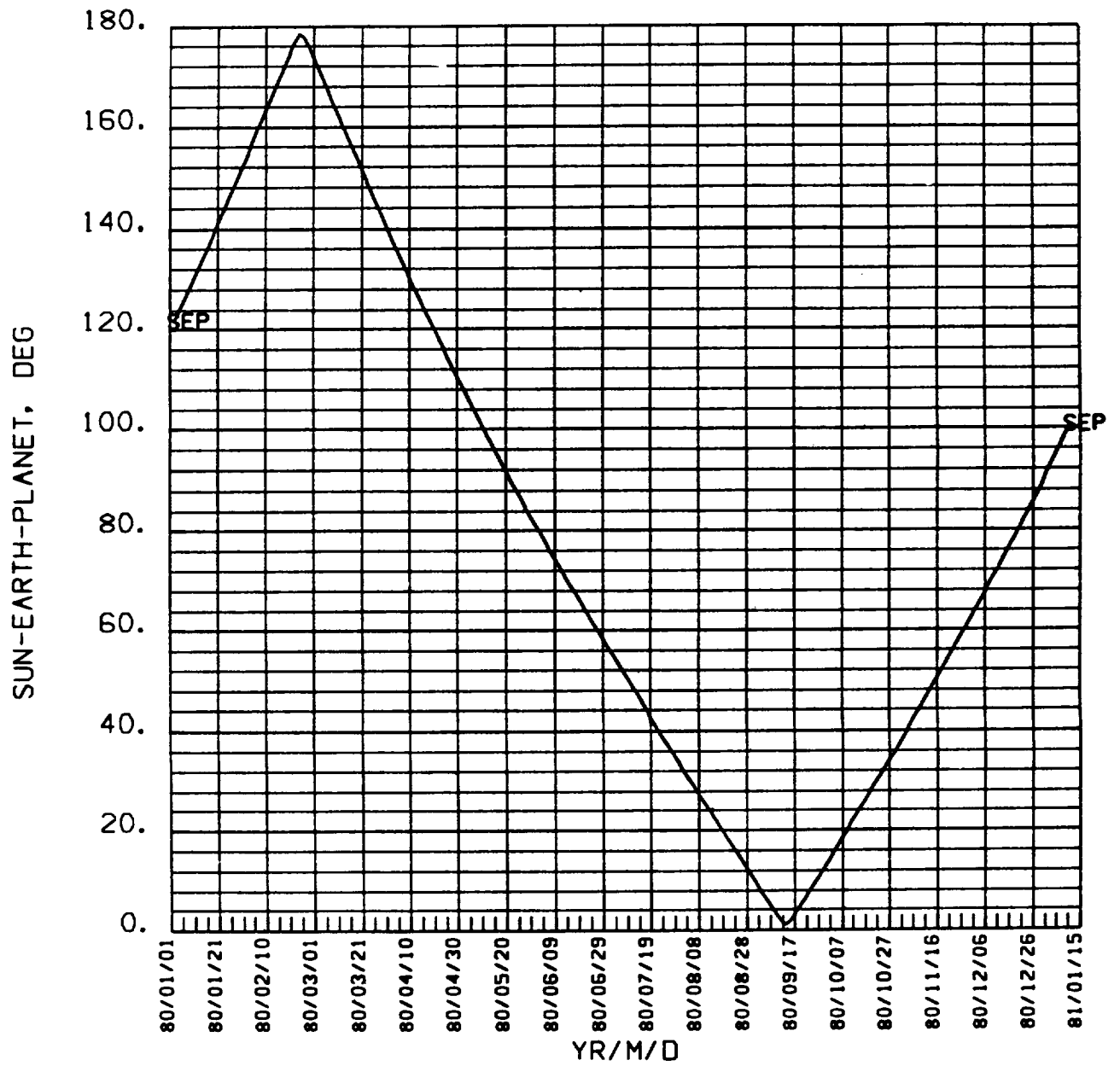


# JUPITER 1980

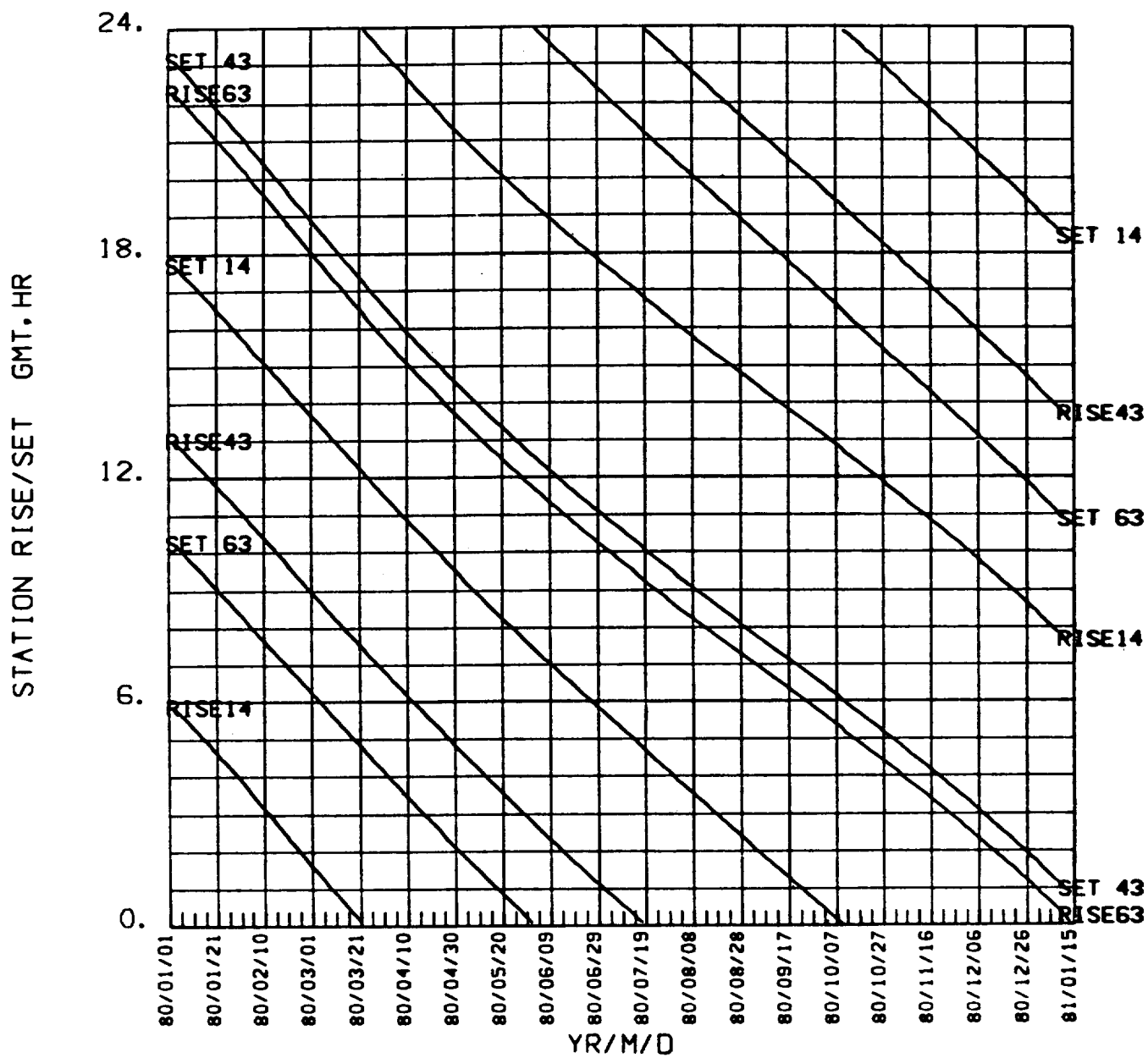




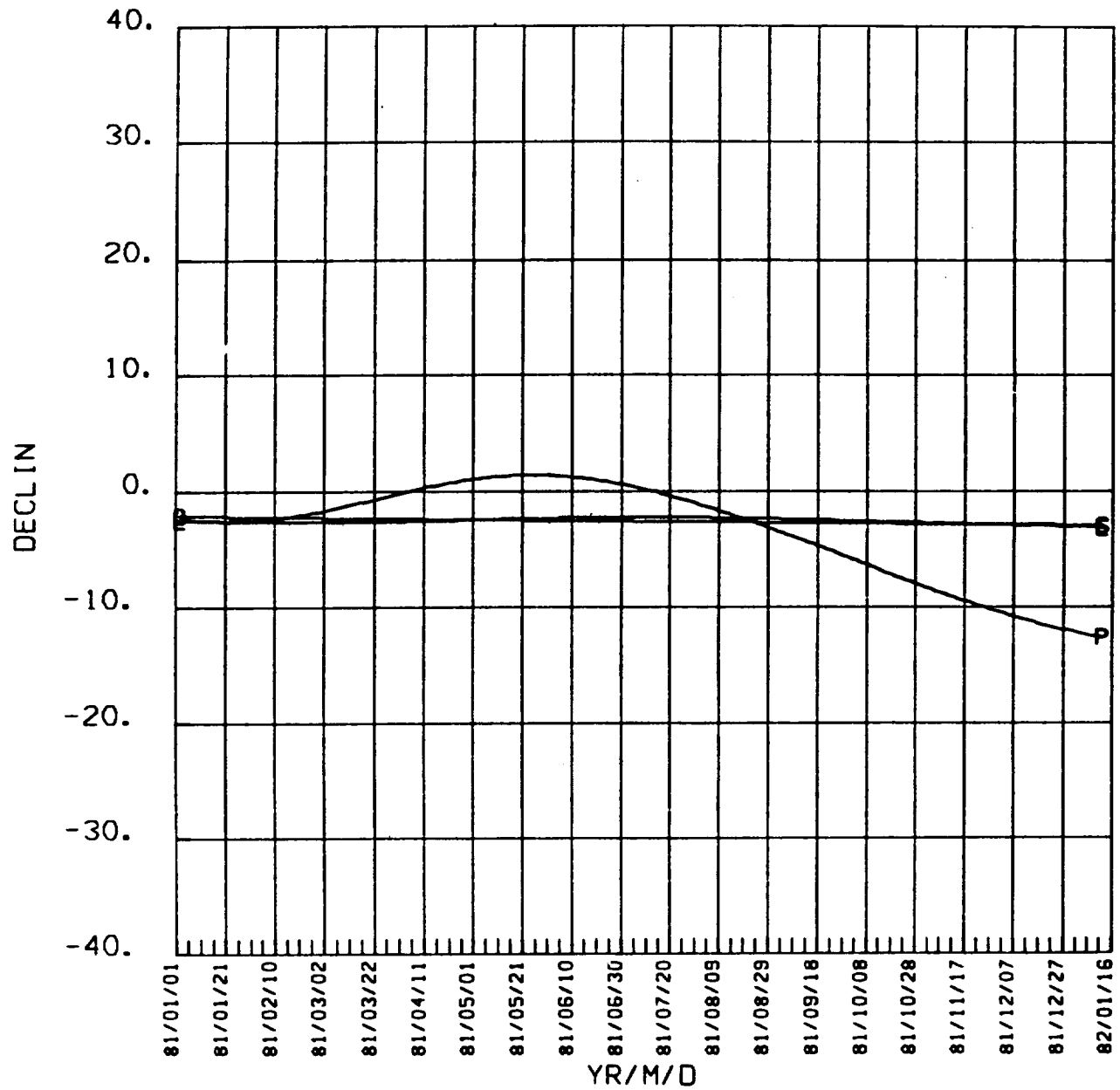
# JUPITER 1980



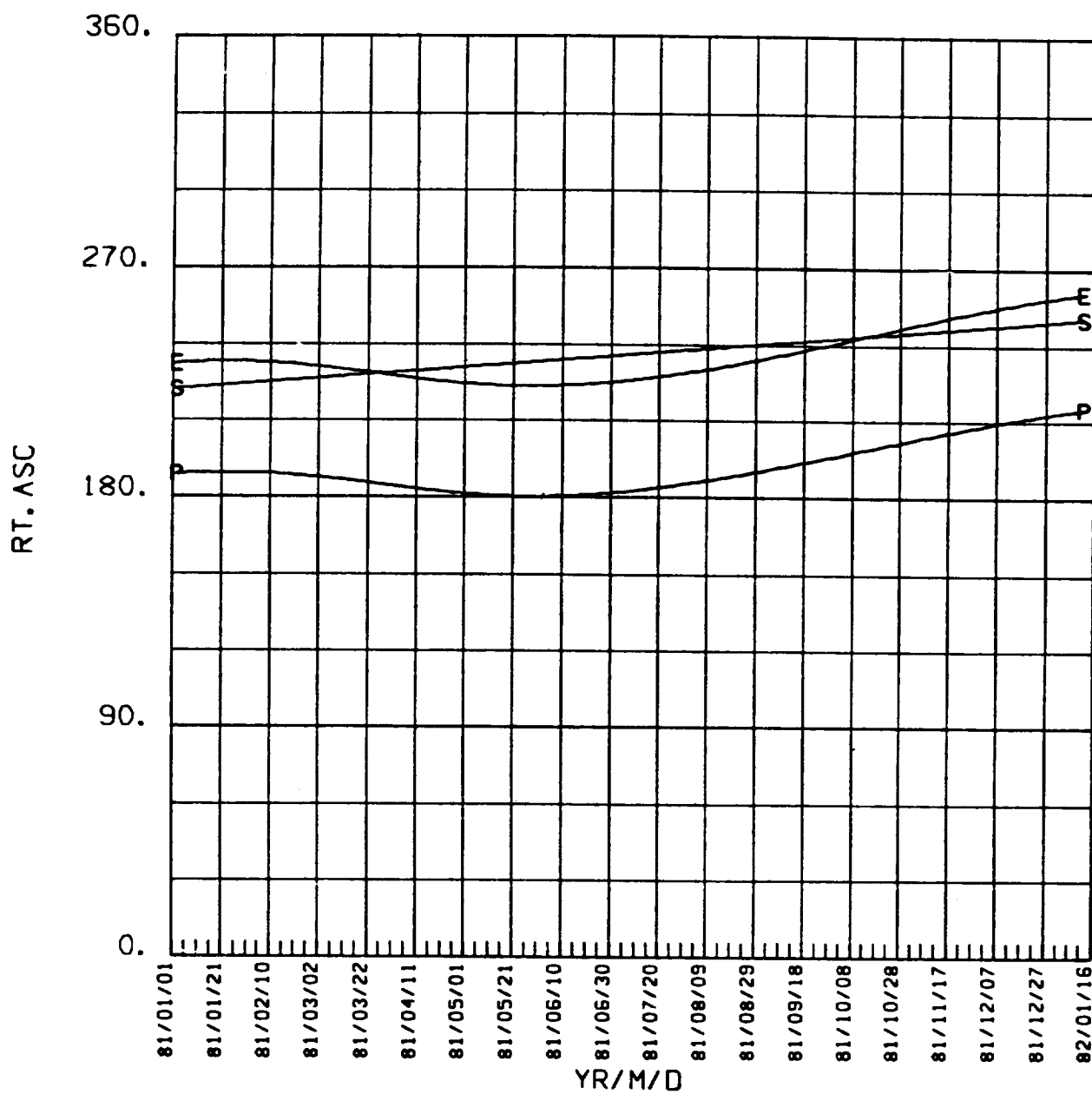
# JUPITER 1980



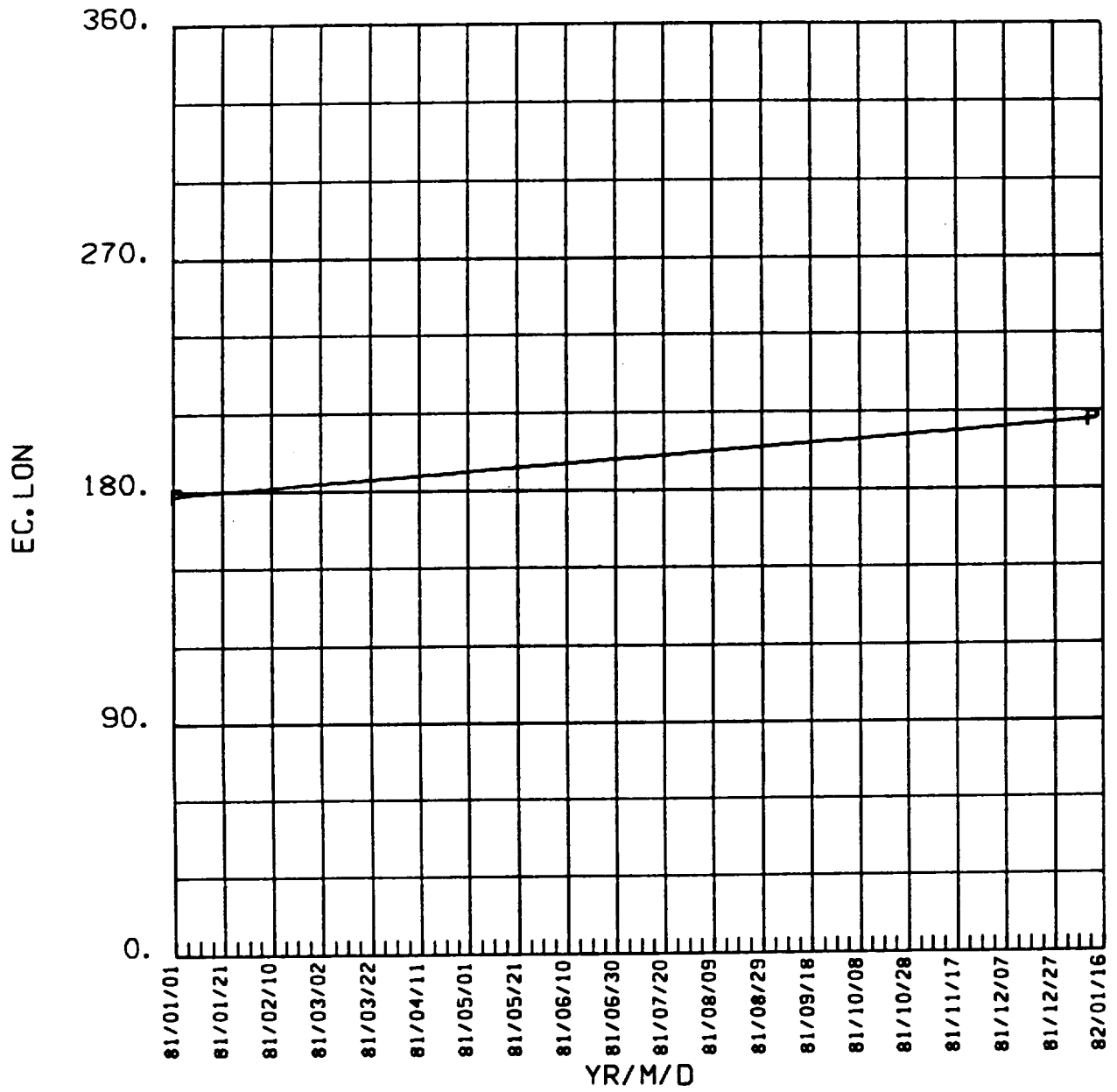
# JUPITER 1981



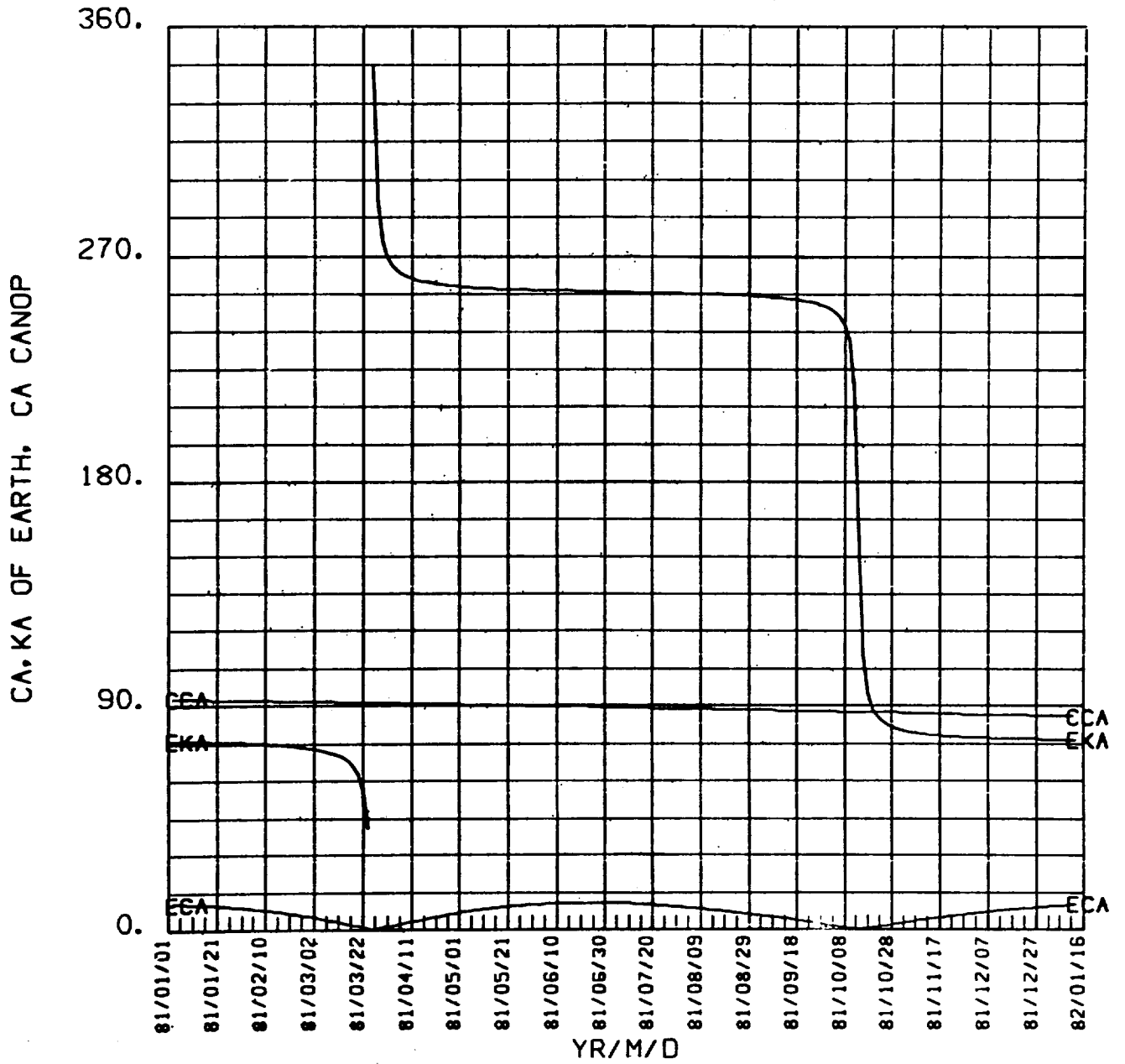
# JUPITER 1981



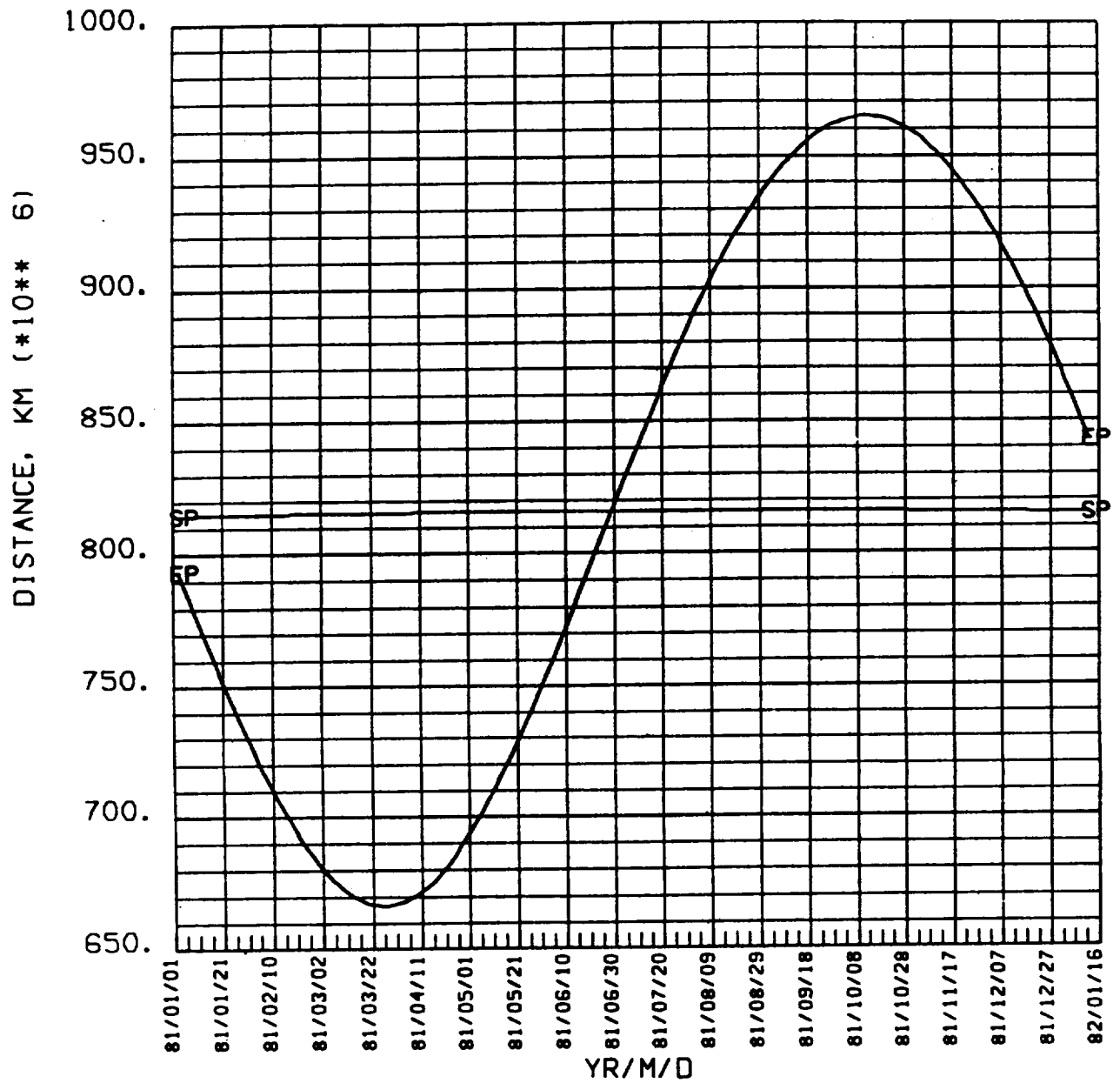
JUPITER 1981



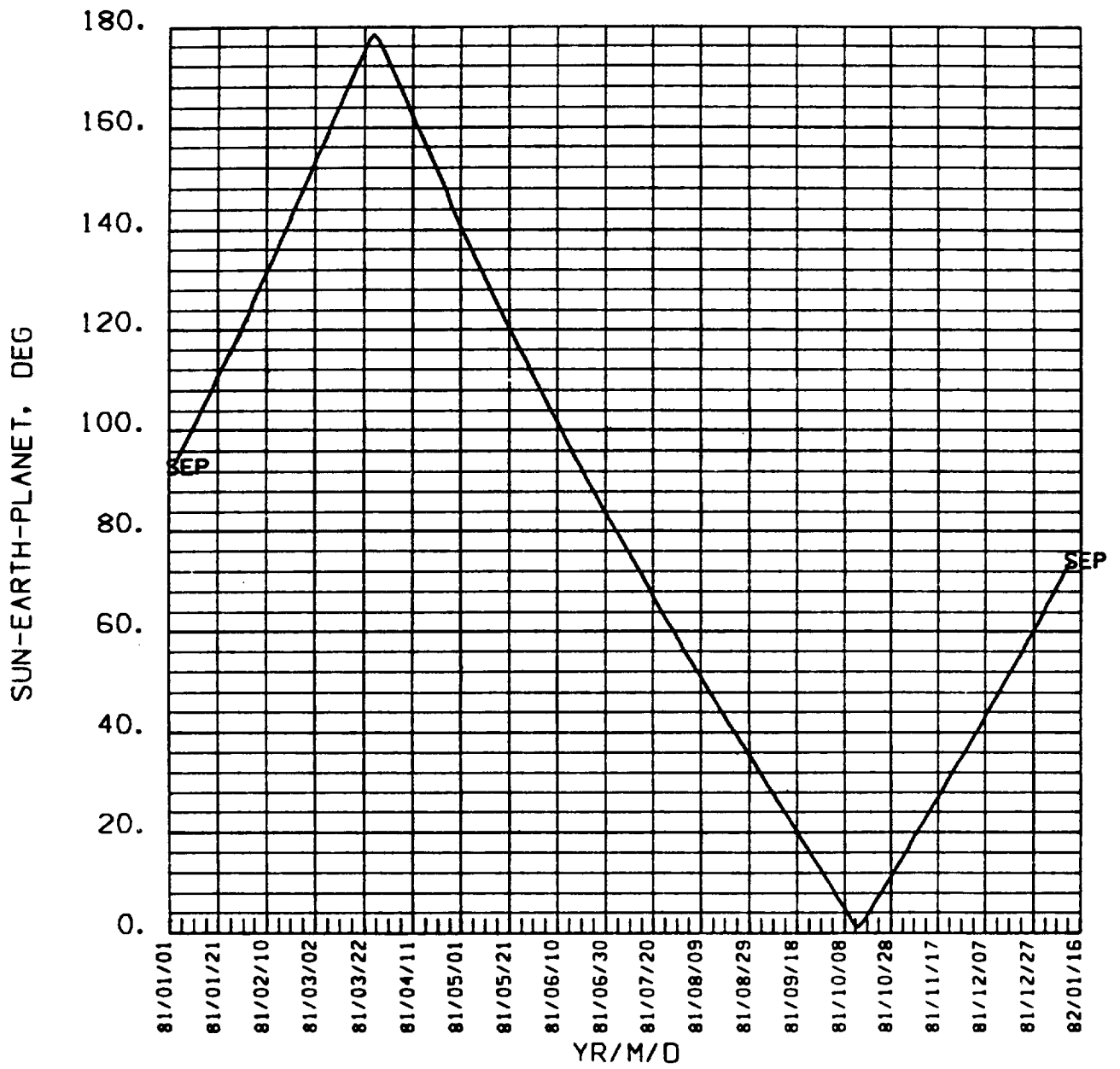
# JUPITER 1981



# JUPITER 1981

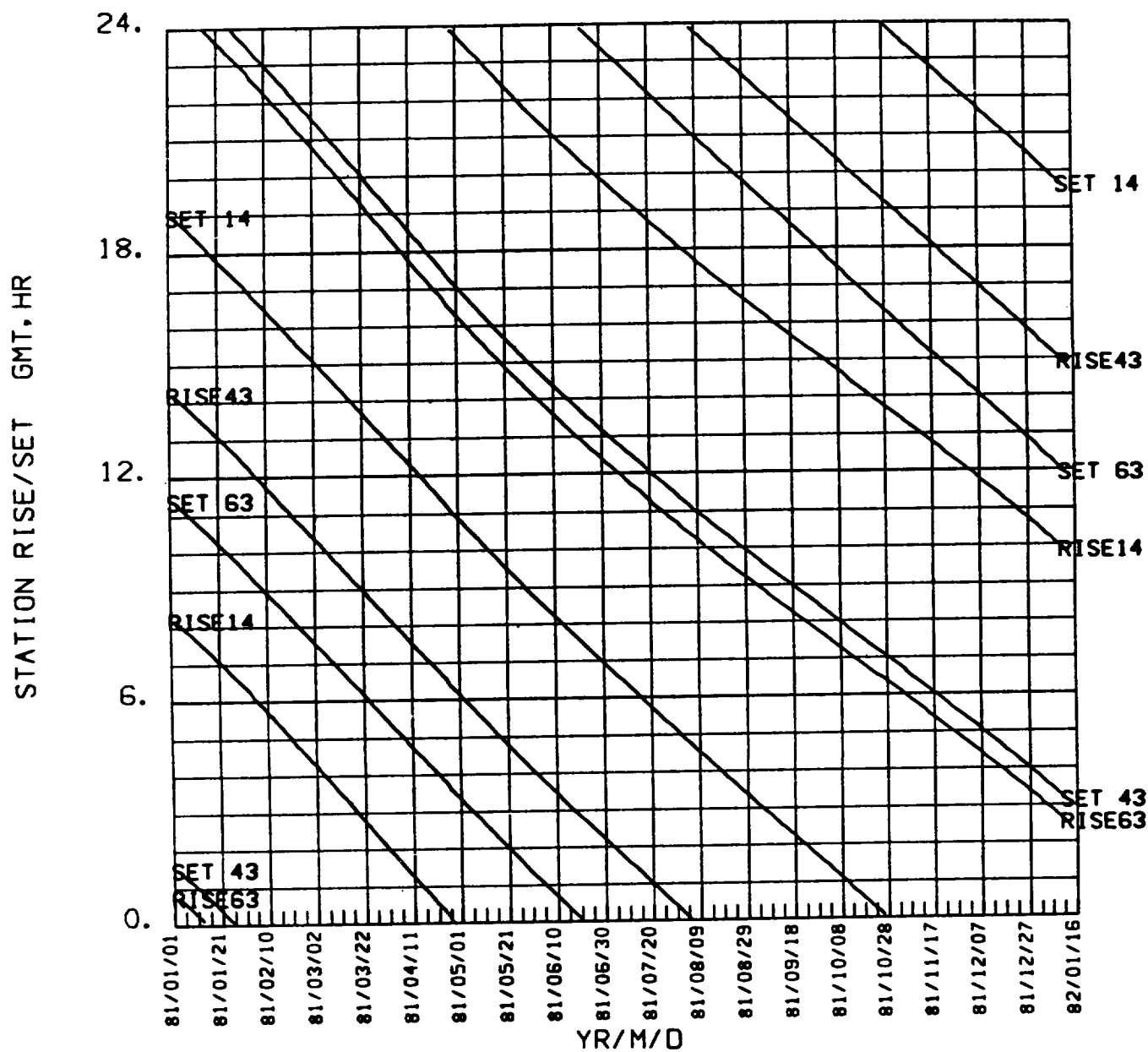


# JUPITER 1981

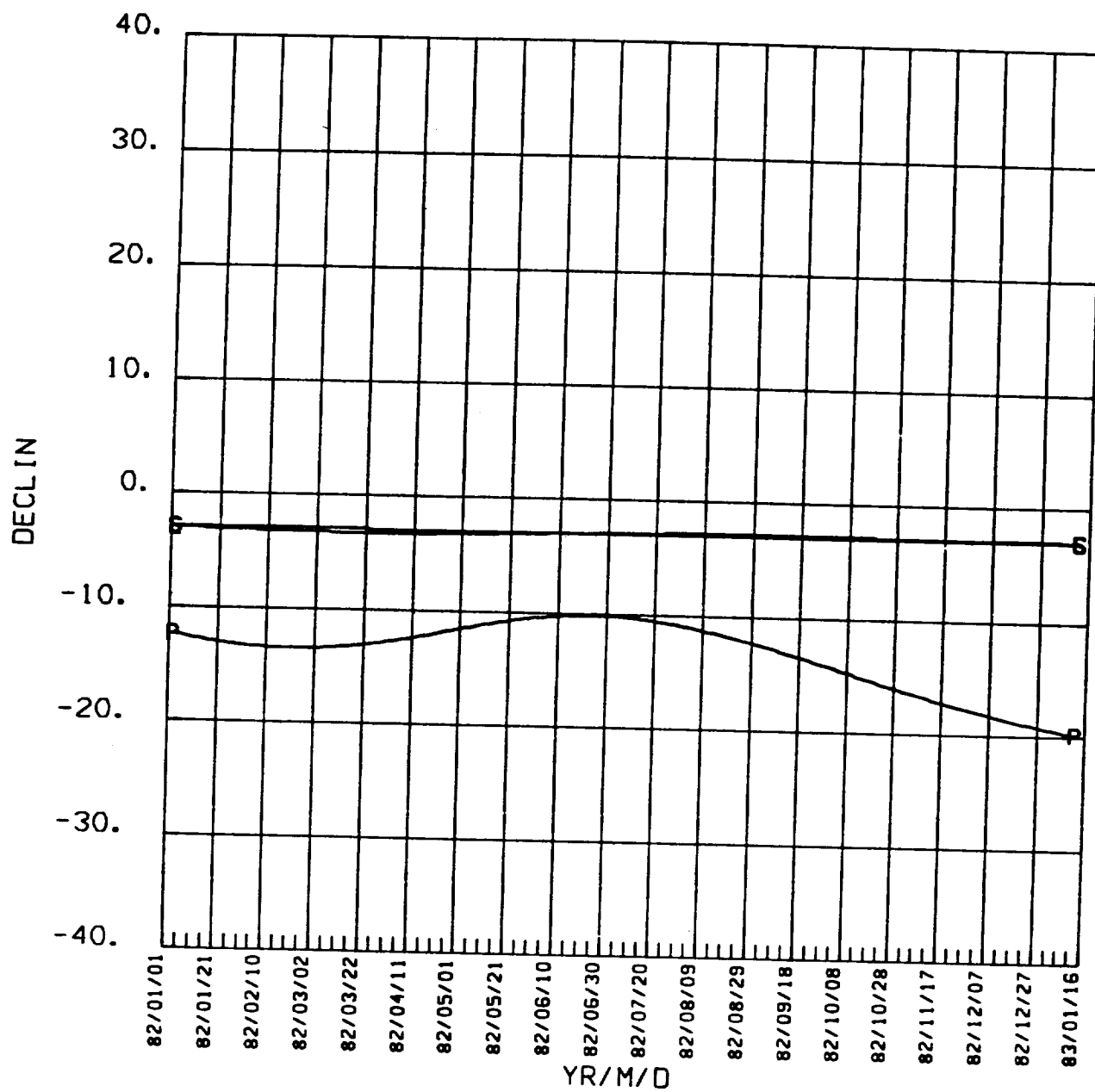




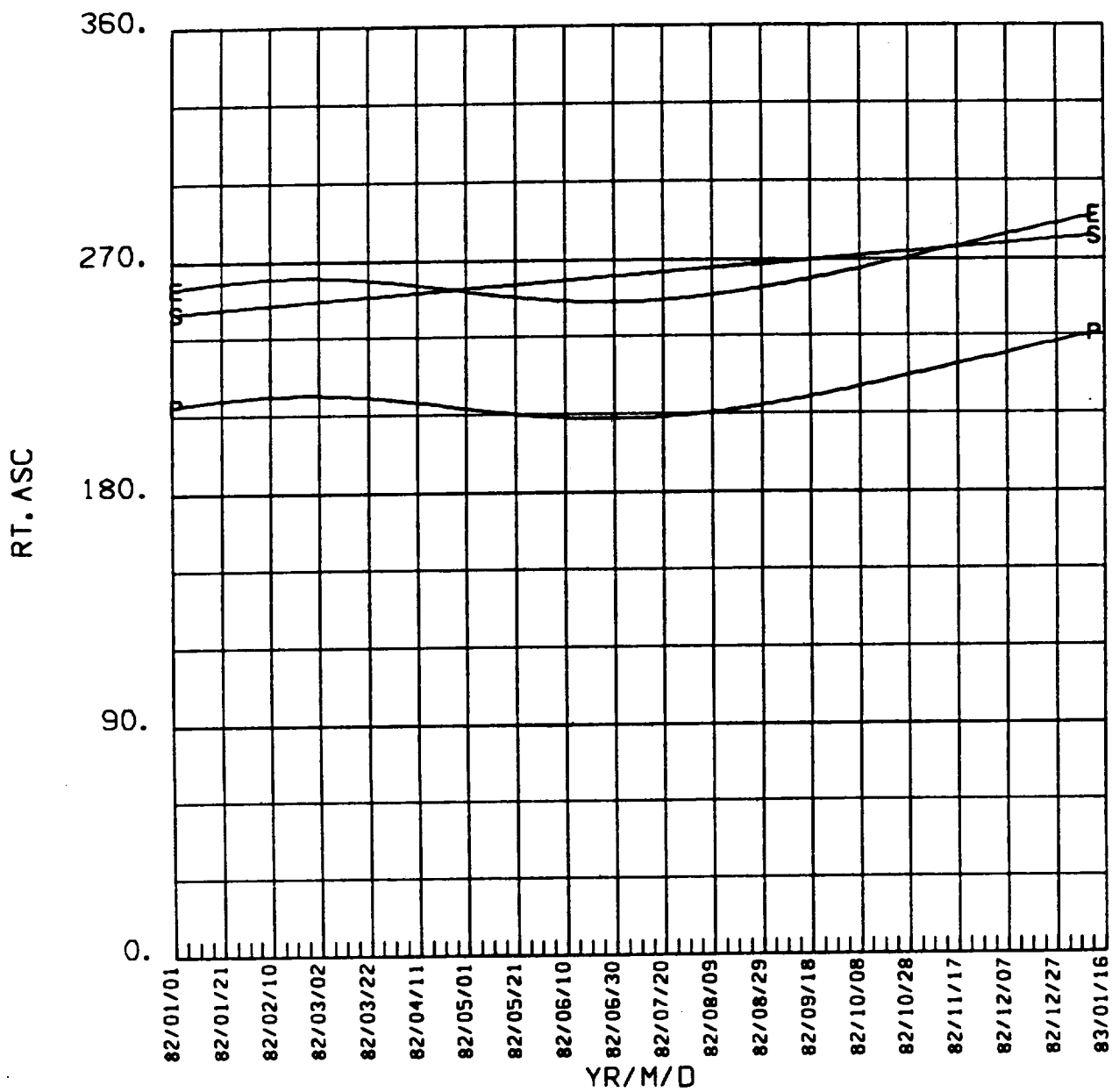
# JUPITER 1981



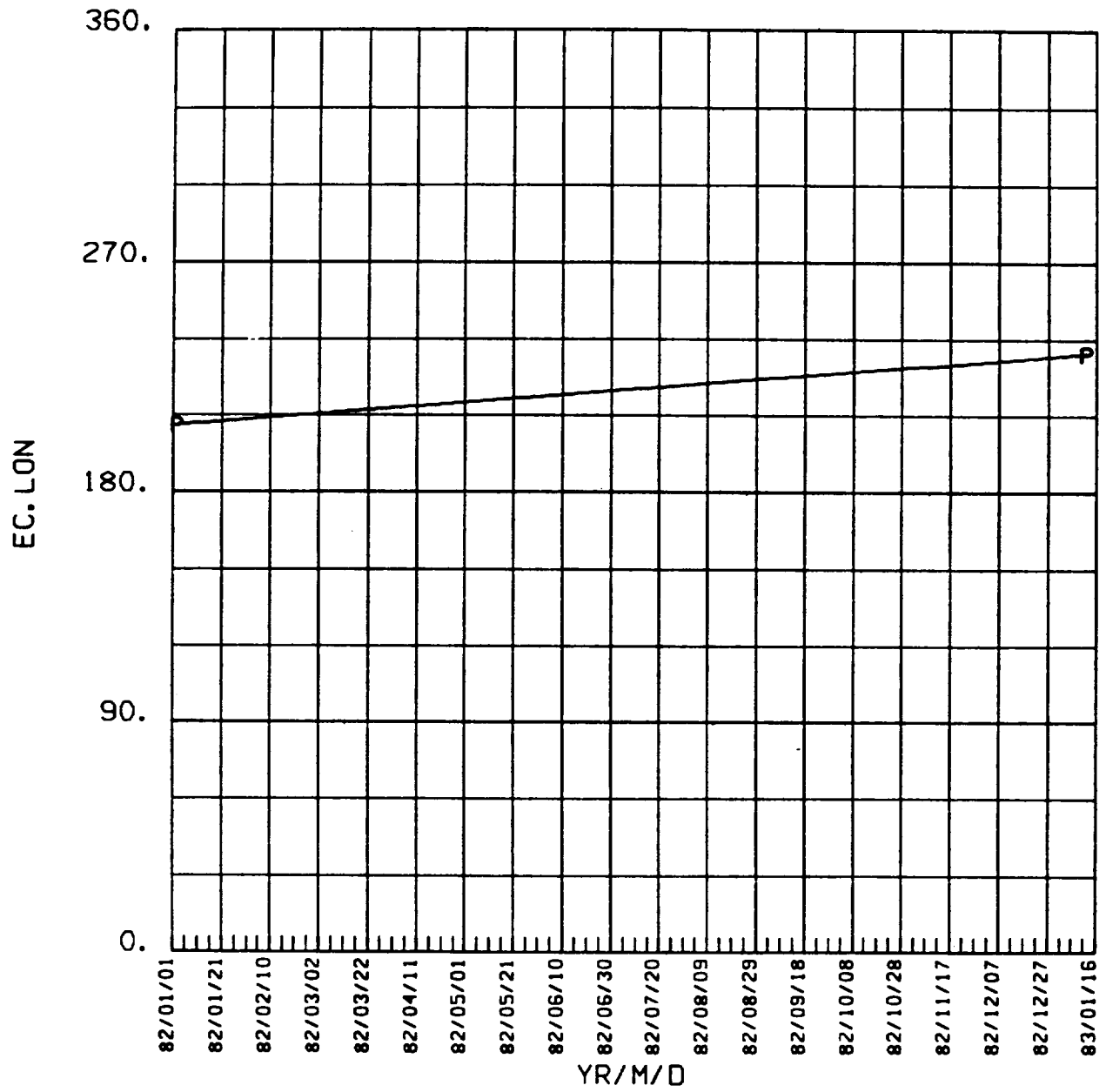
# JUPITER 1982



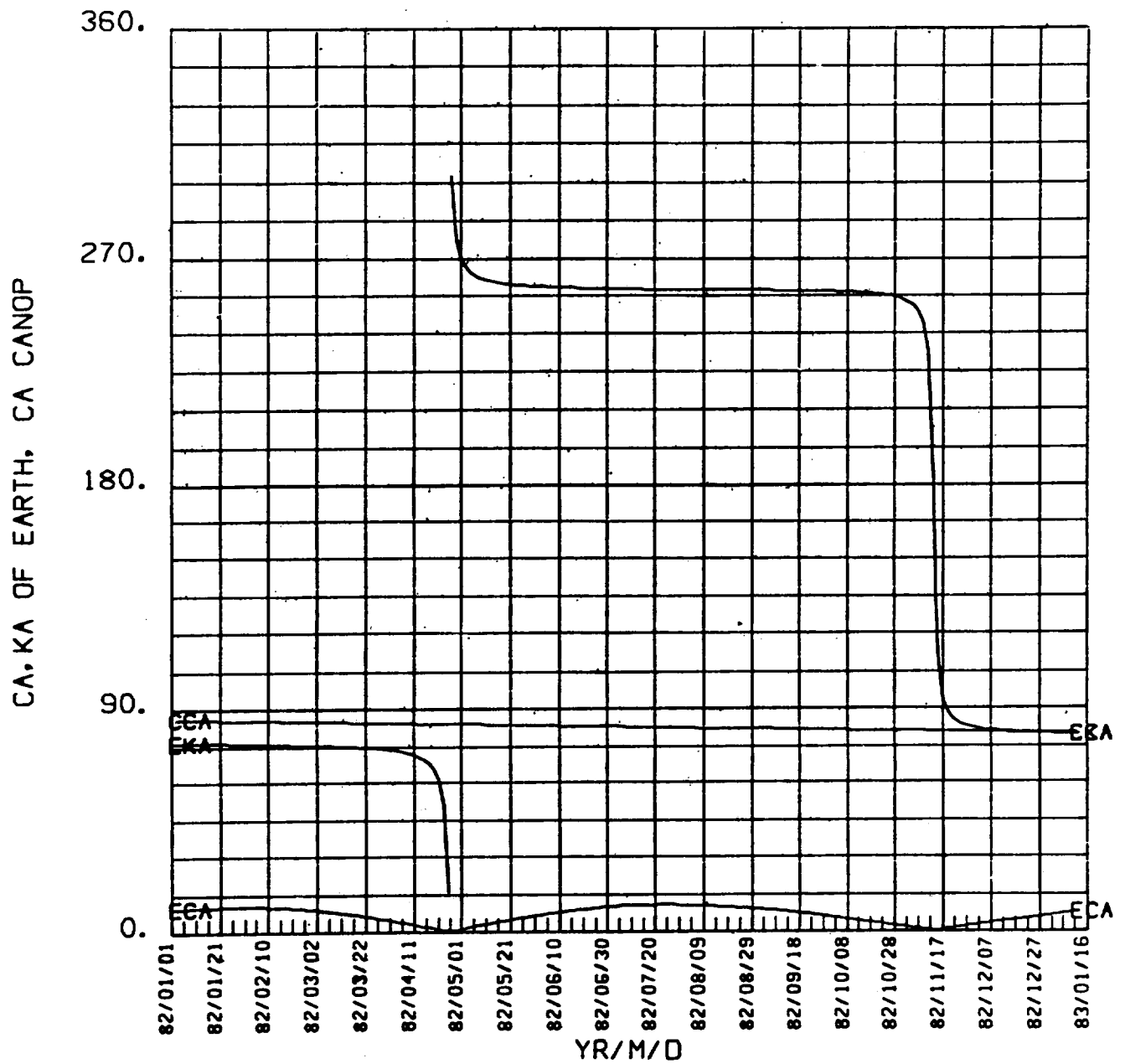
# JUPITER 1982



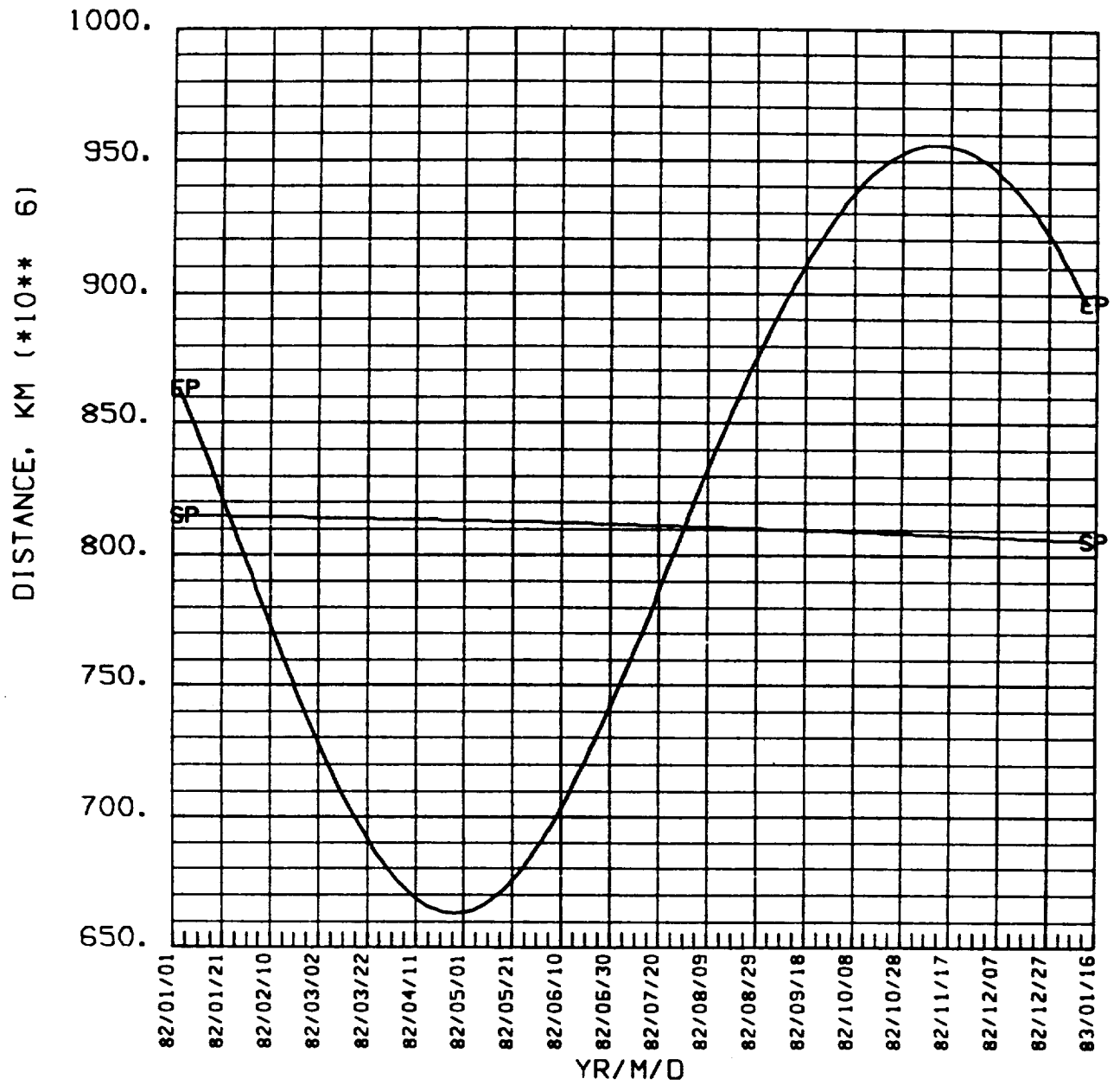
# JUPITER 1982



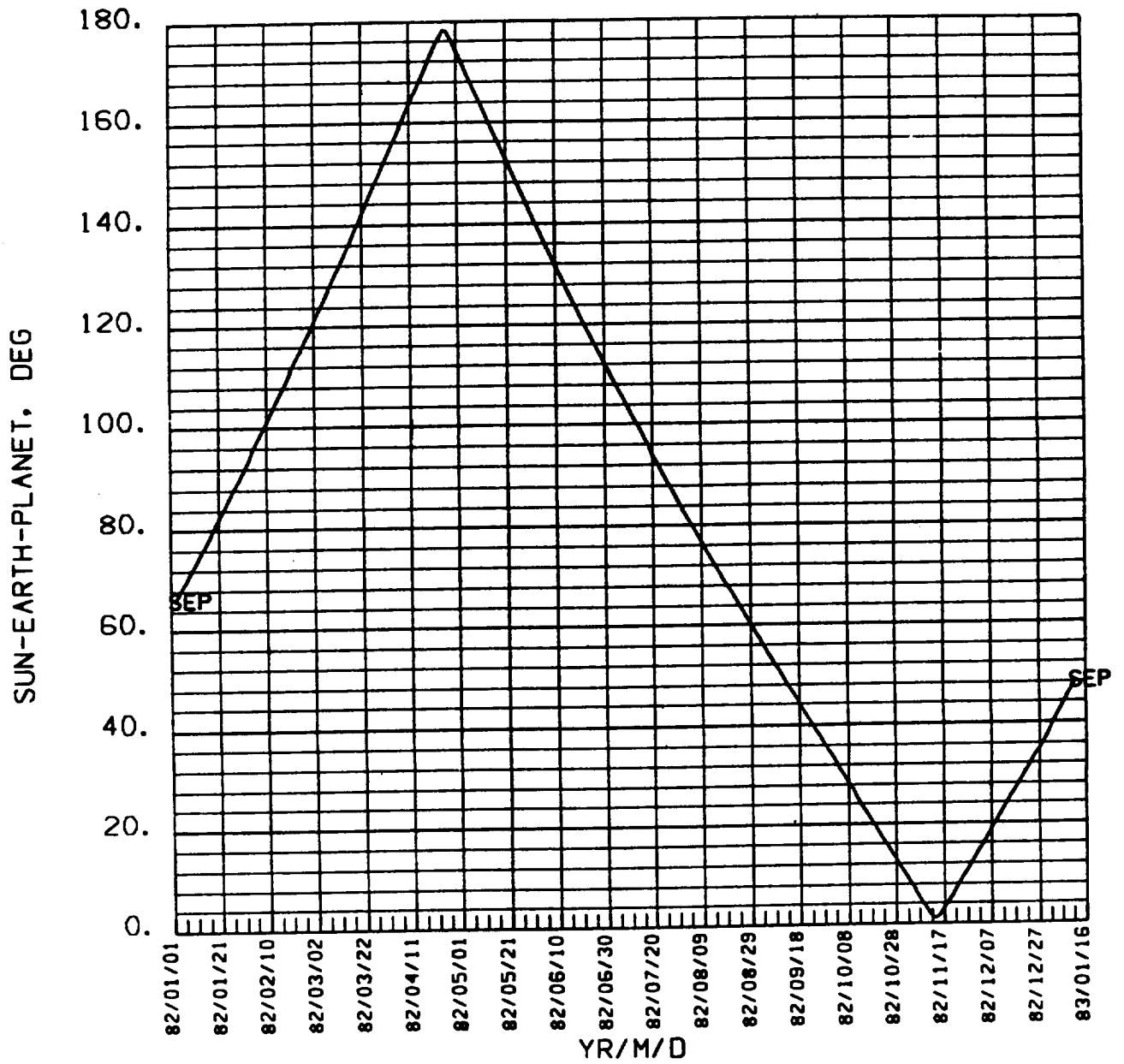
# JUPITER 1982



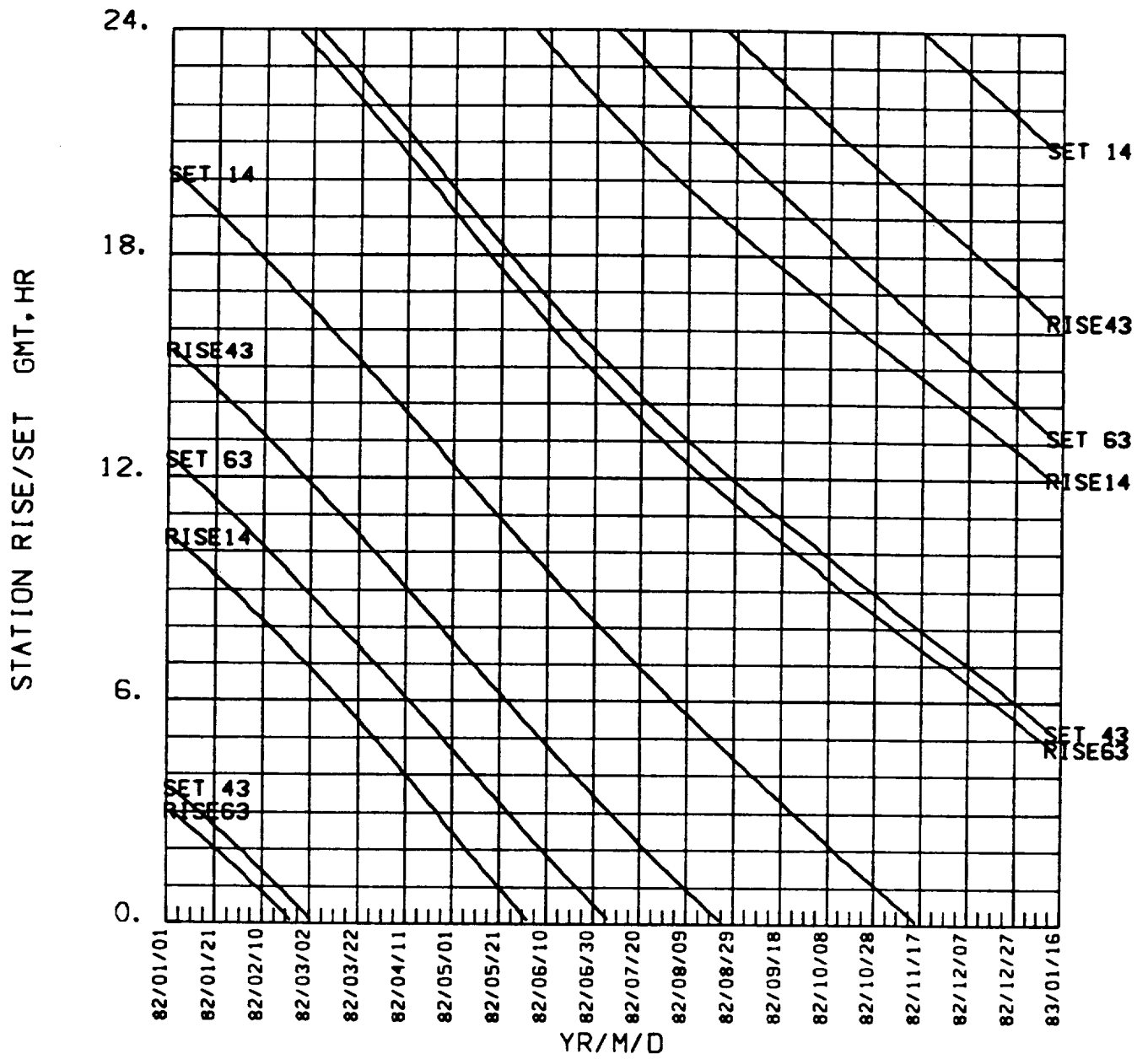
# JUPITER 1982



# JUPITER 1982

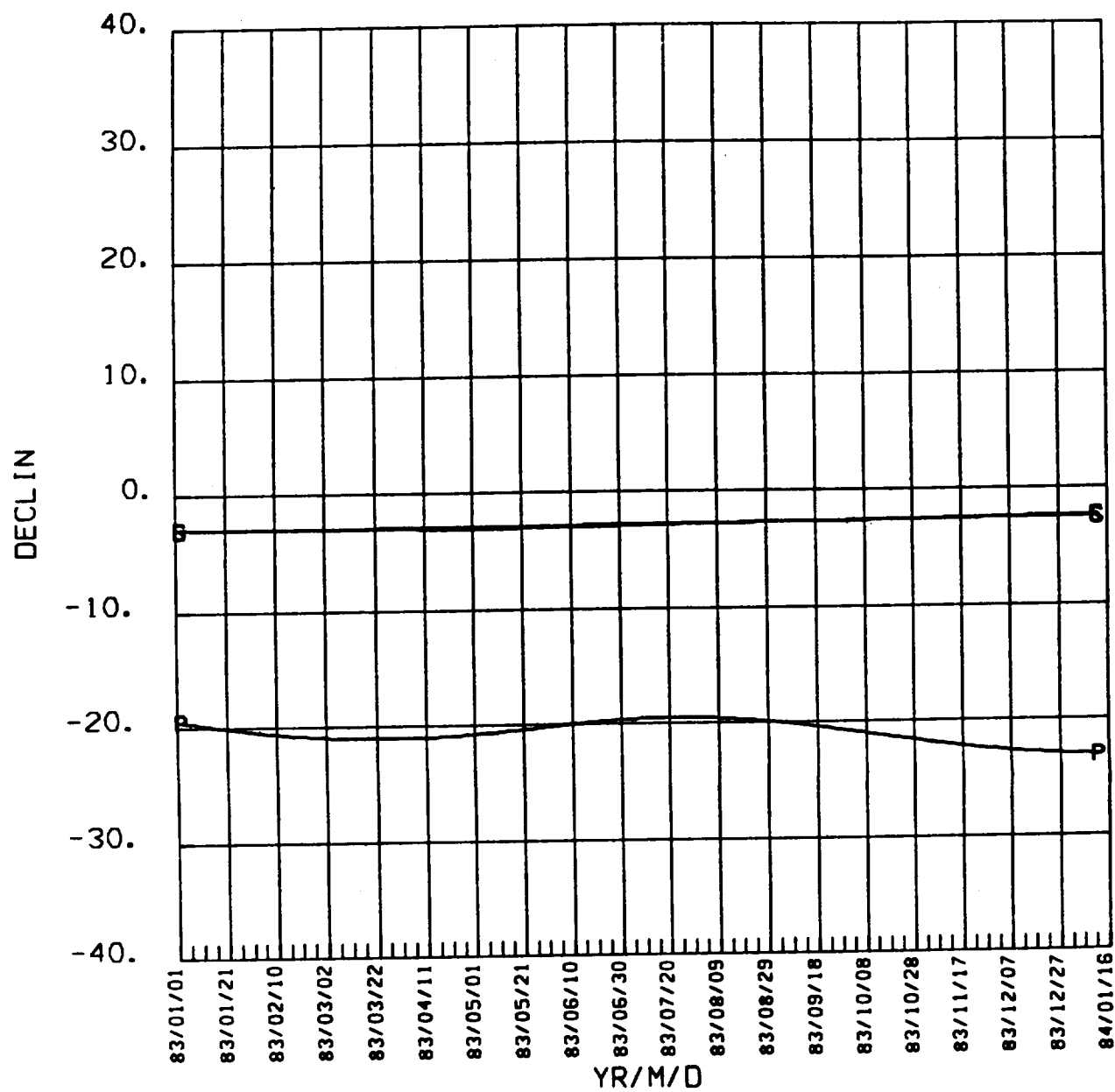


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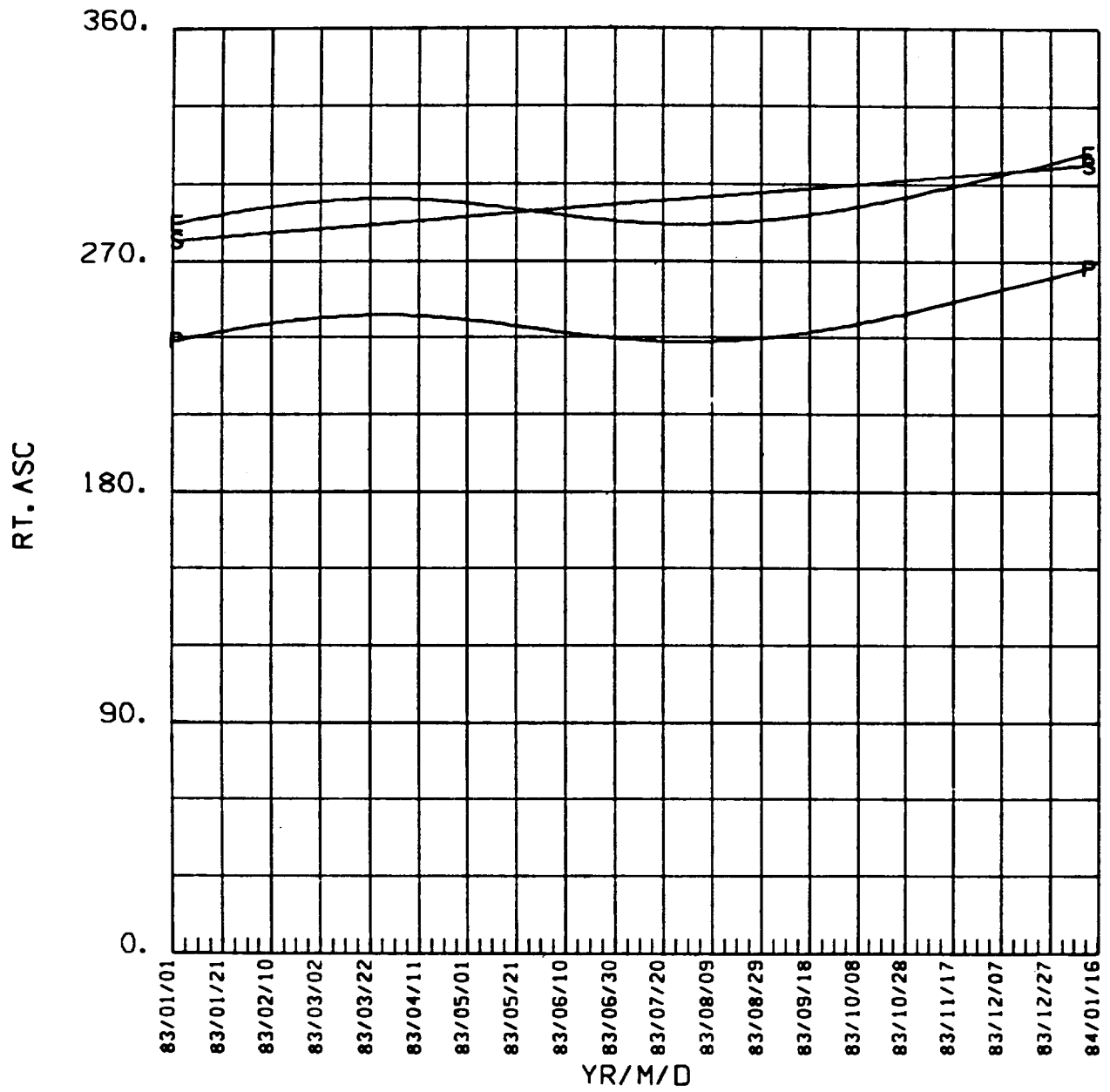




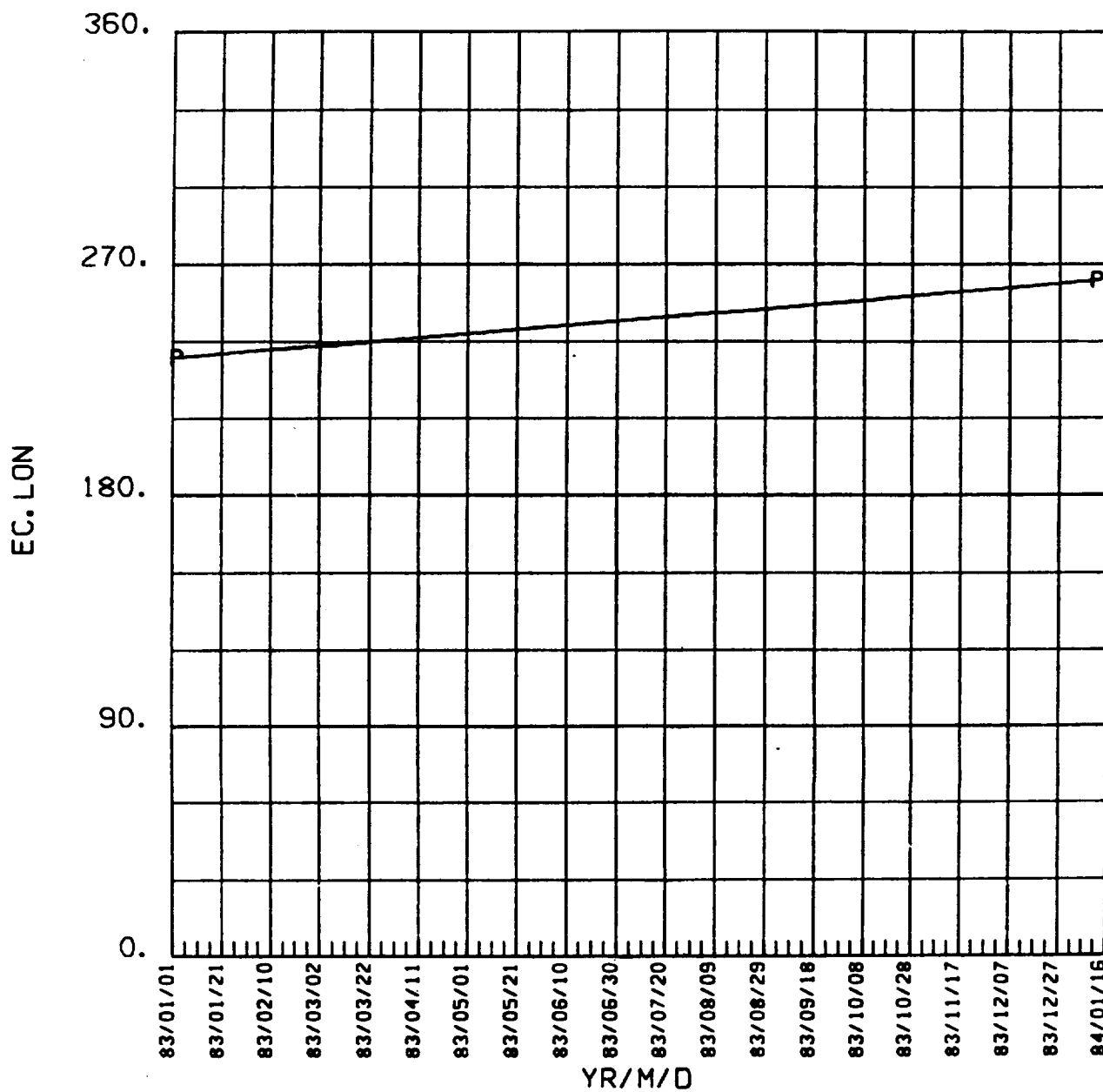
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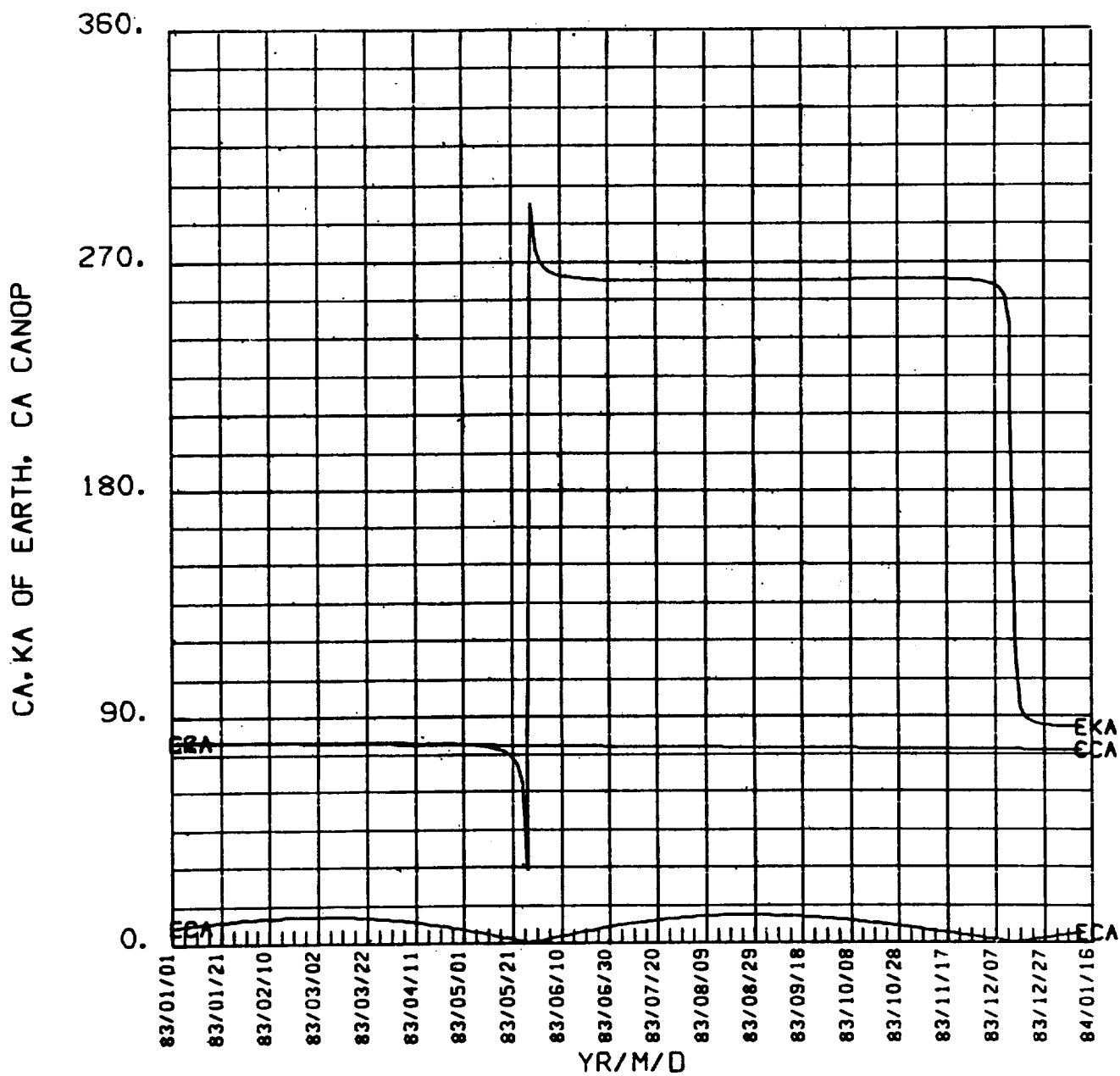
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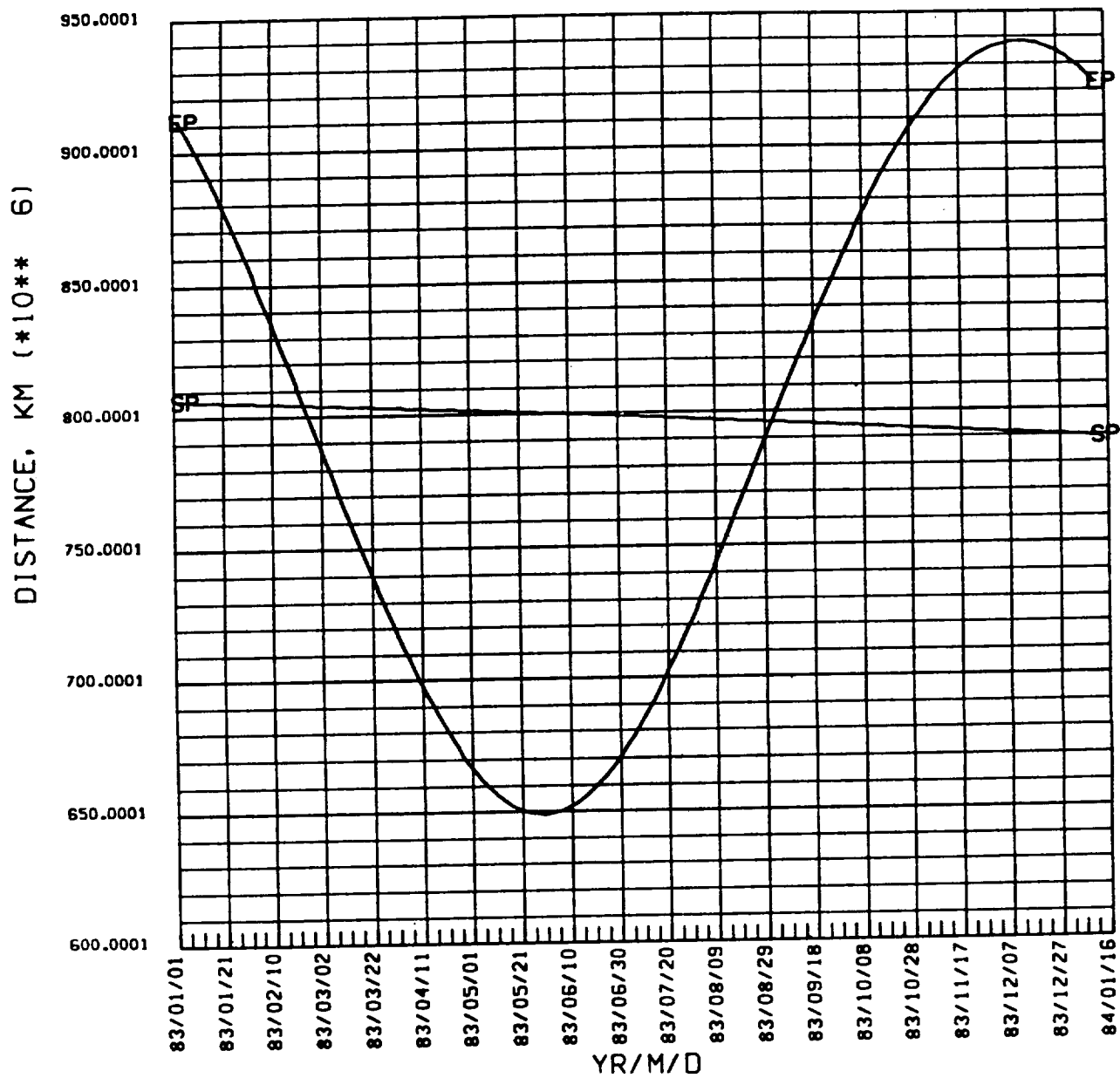
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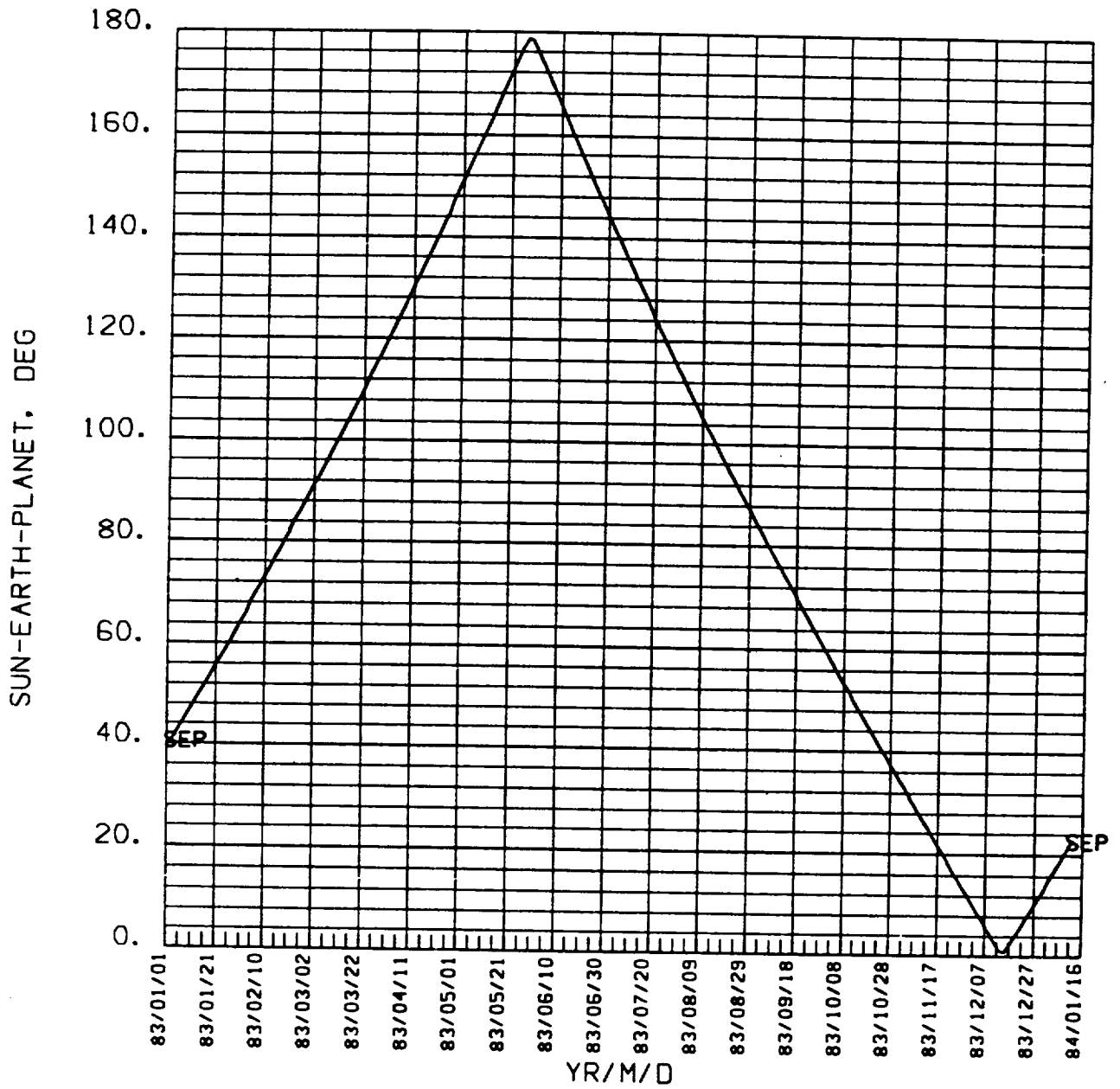
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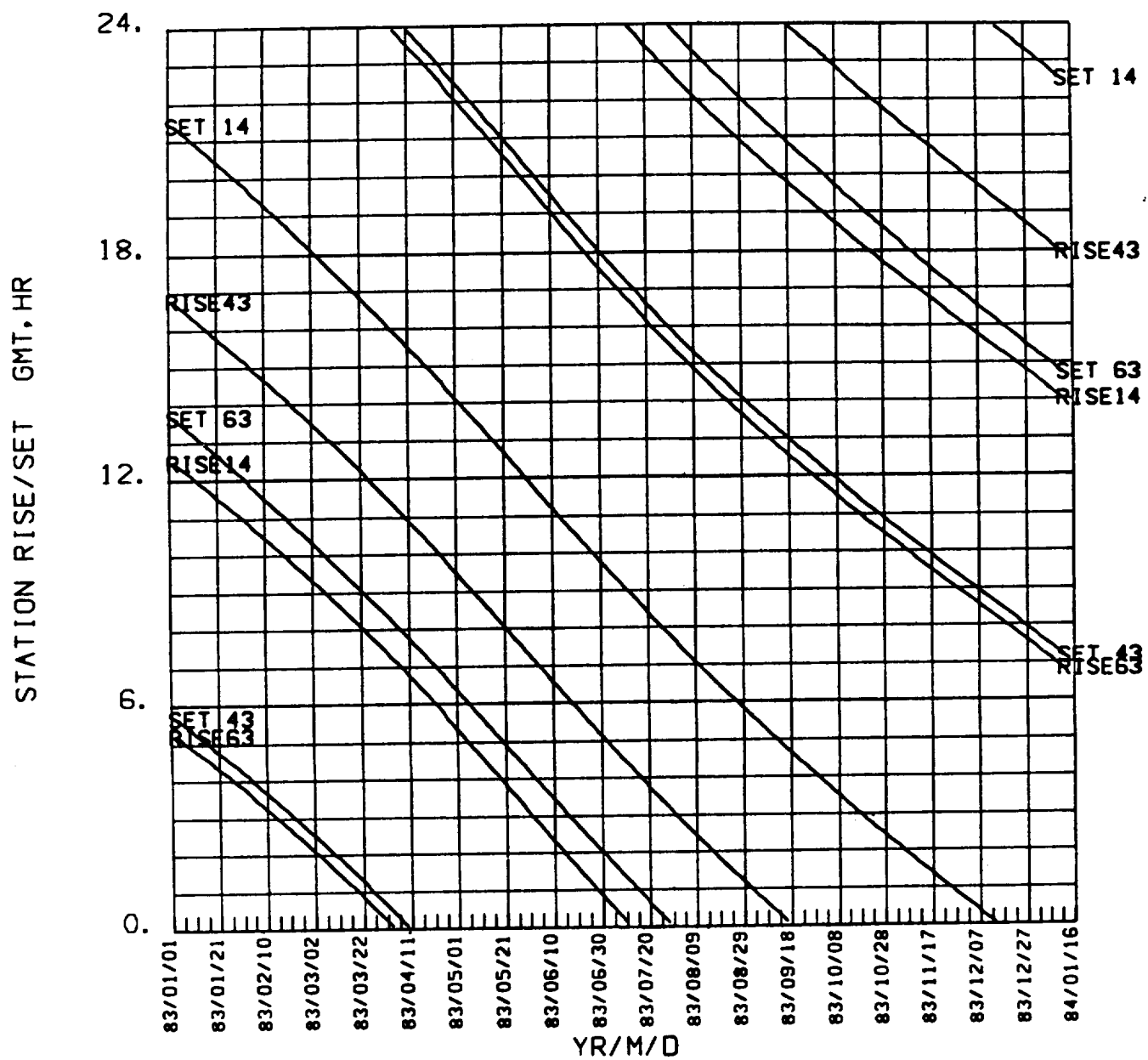
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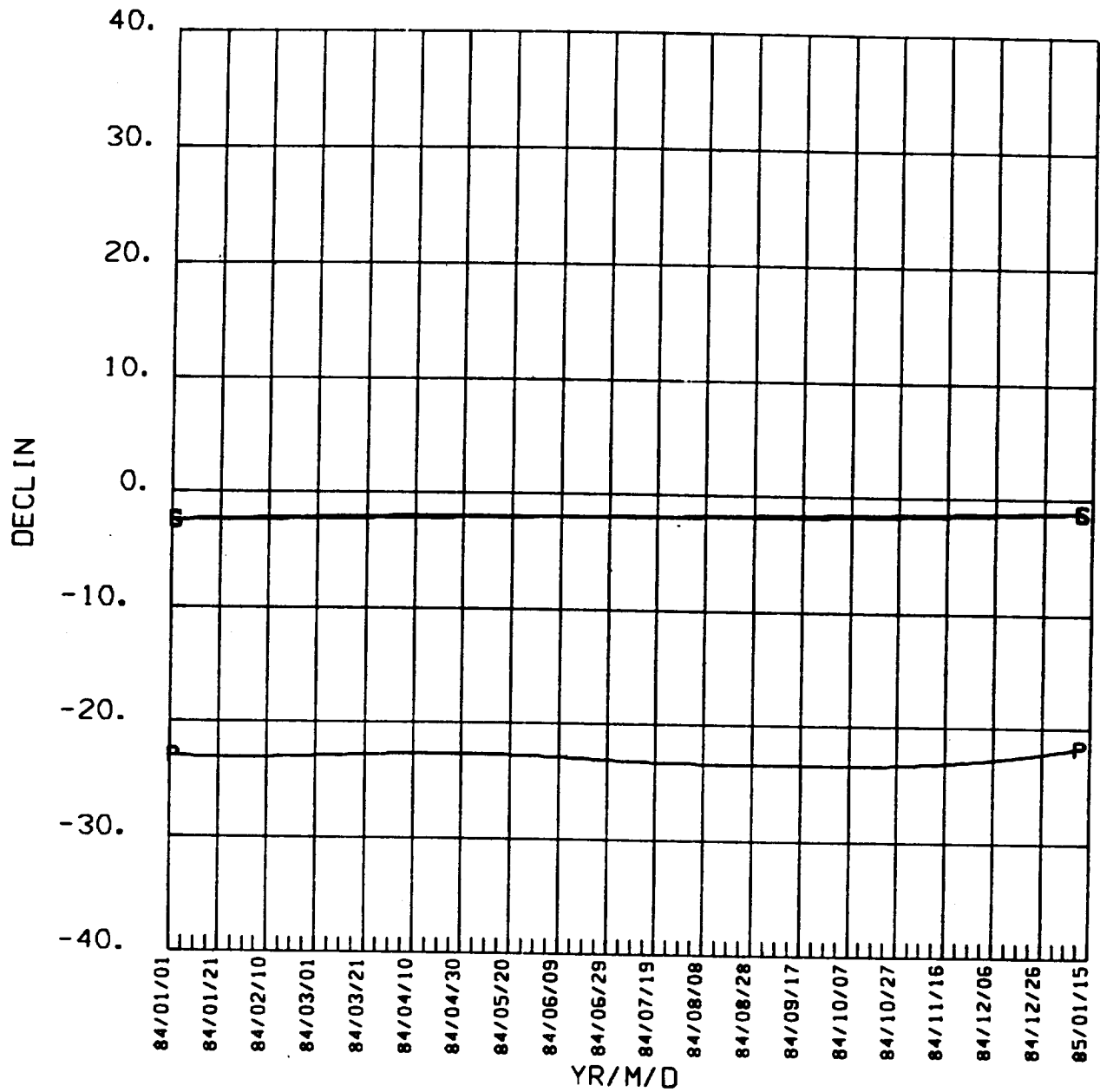
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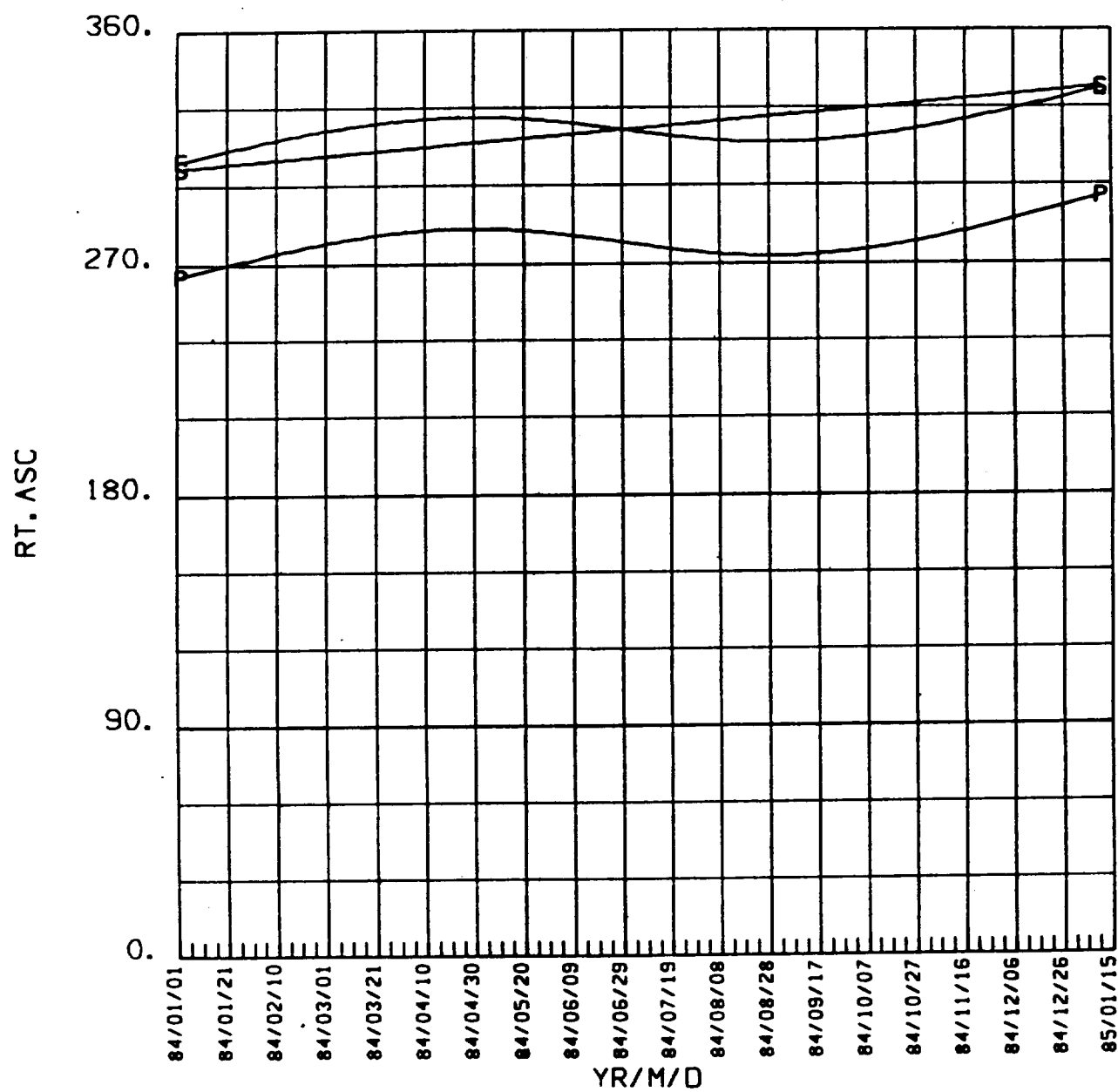


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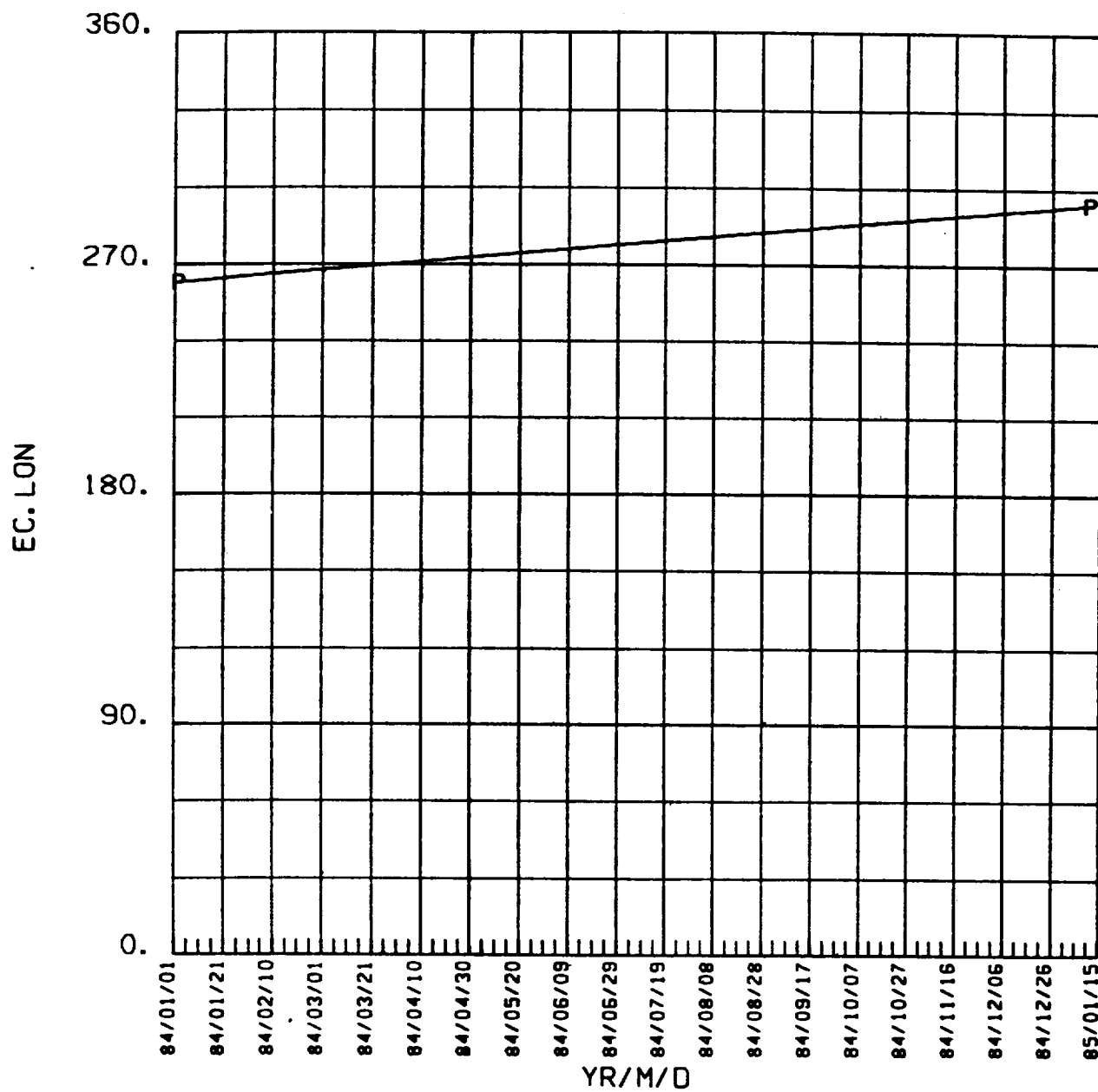




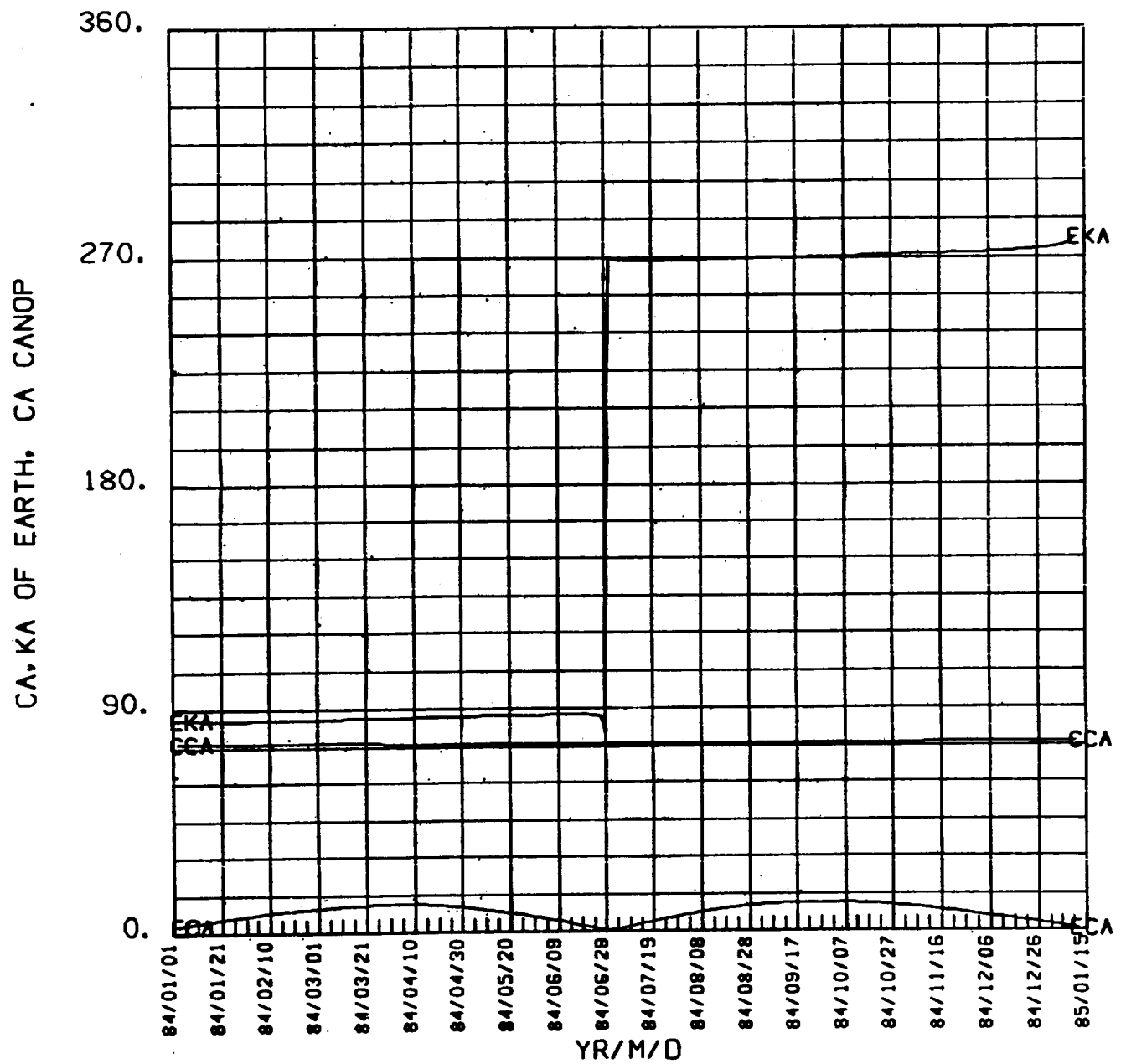
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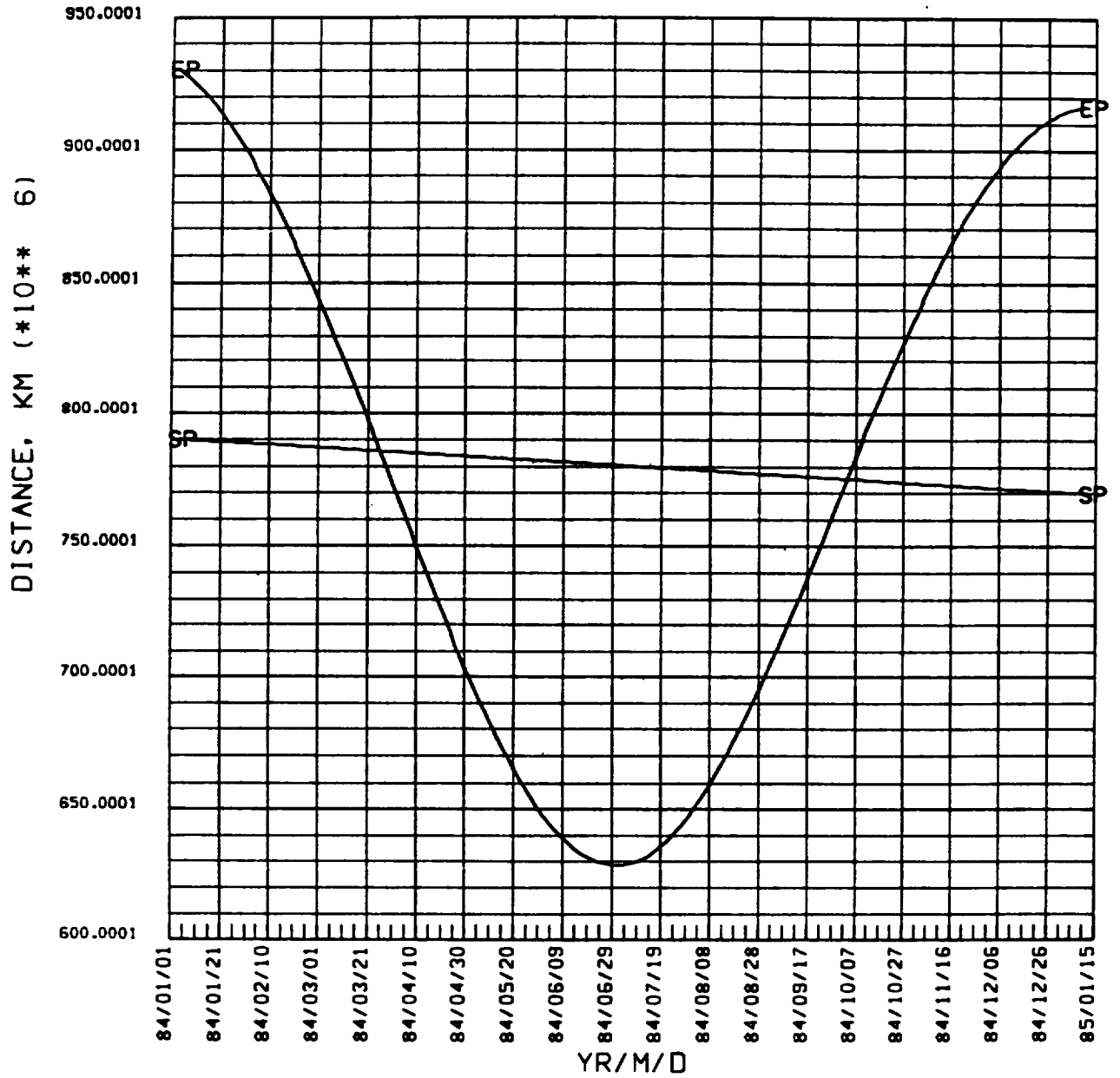
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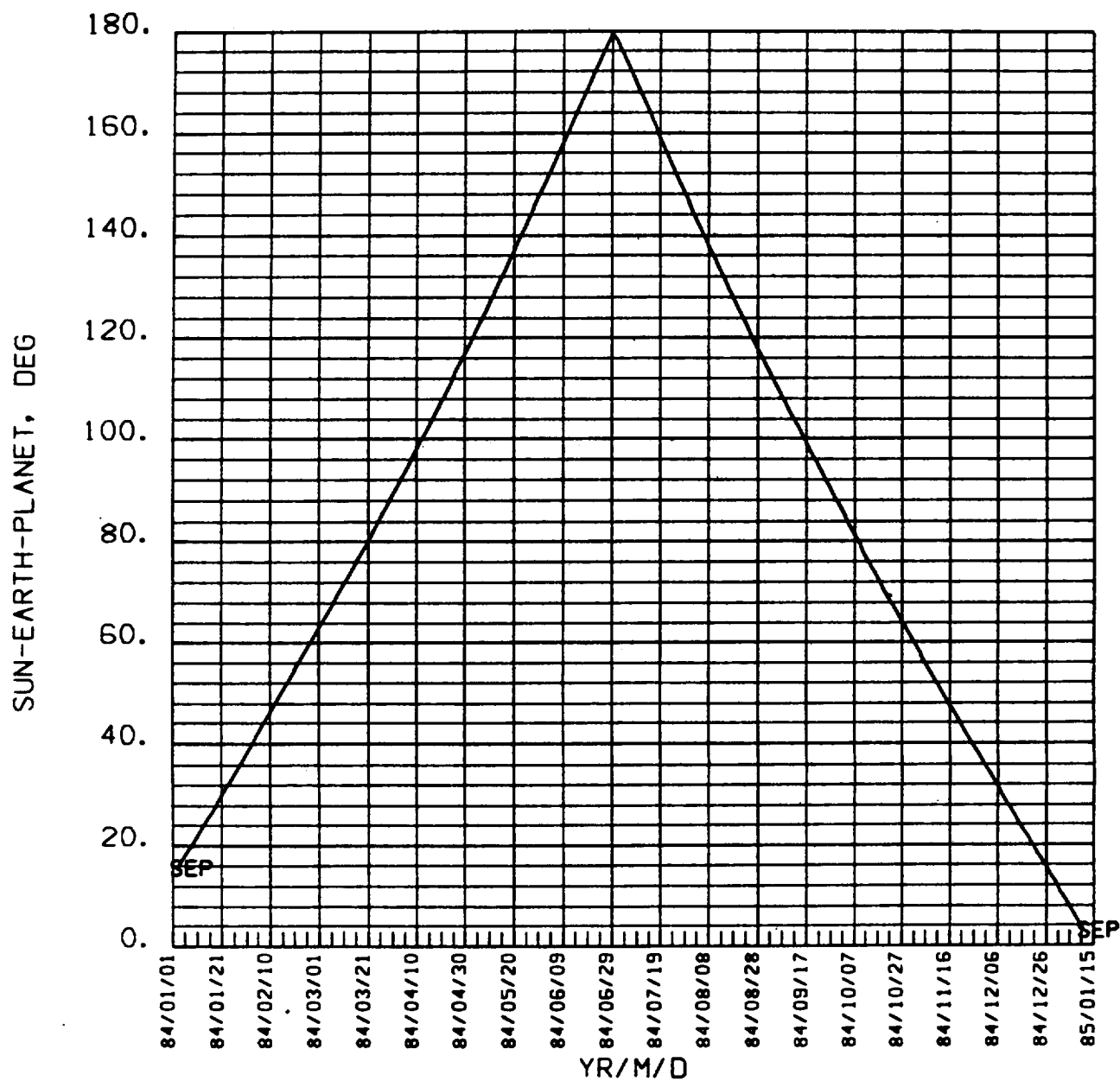
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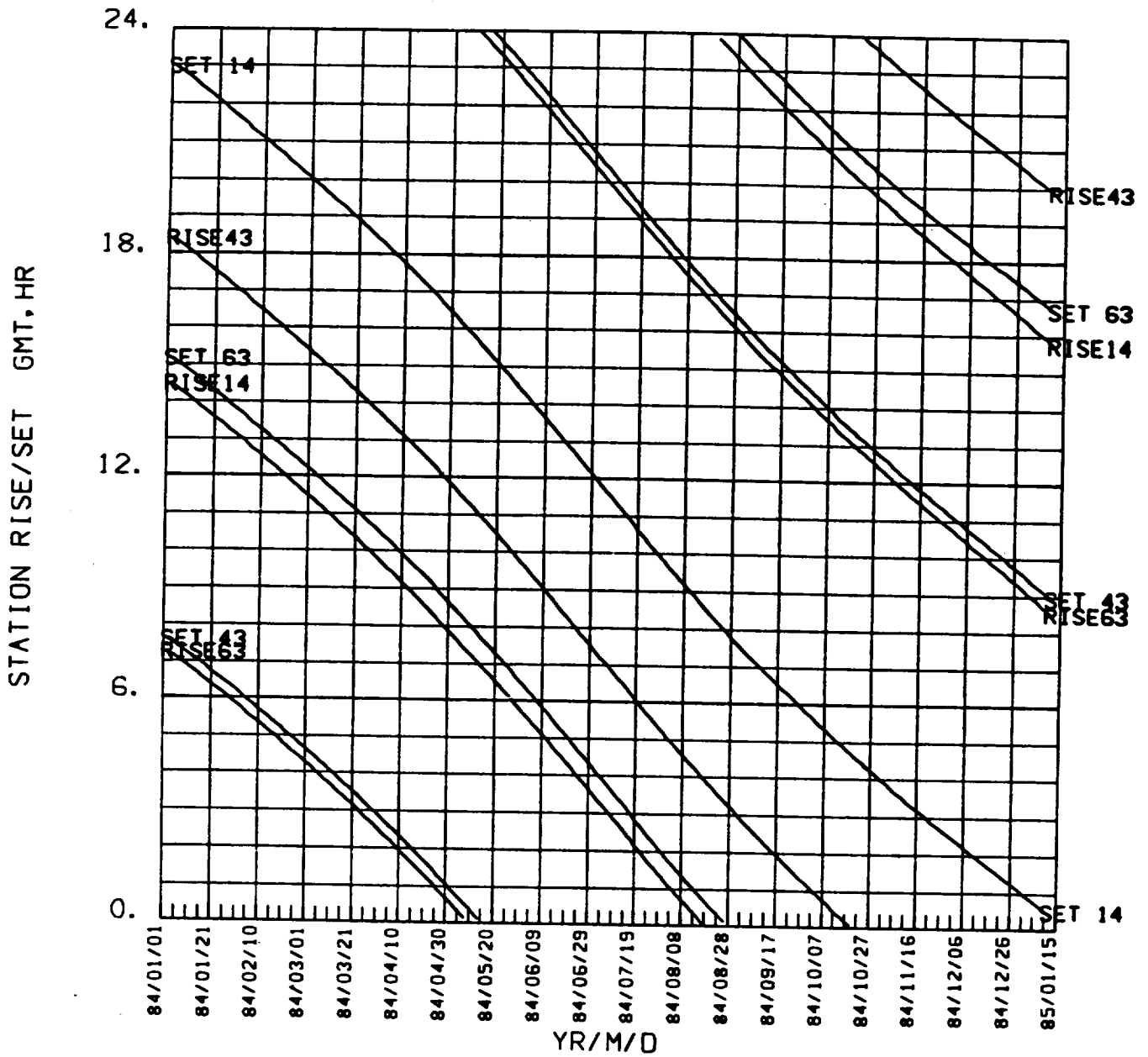
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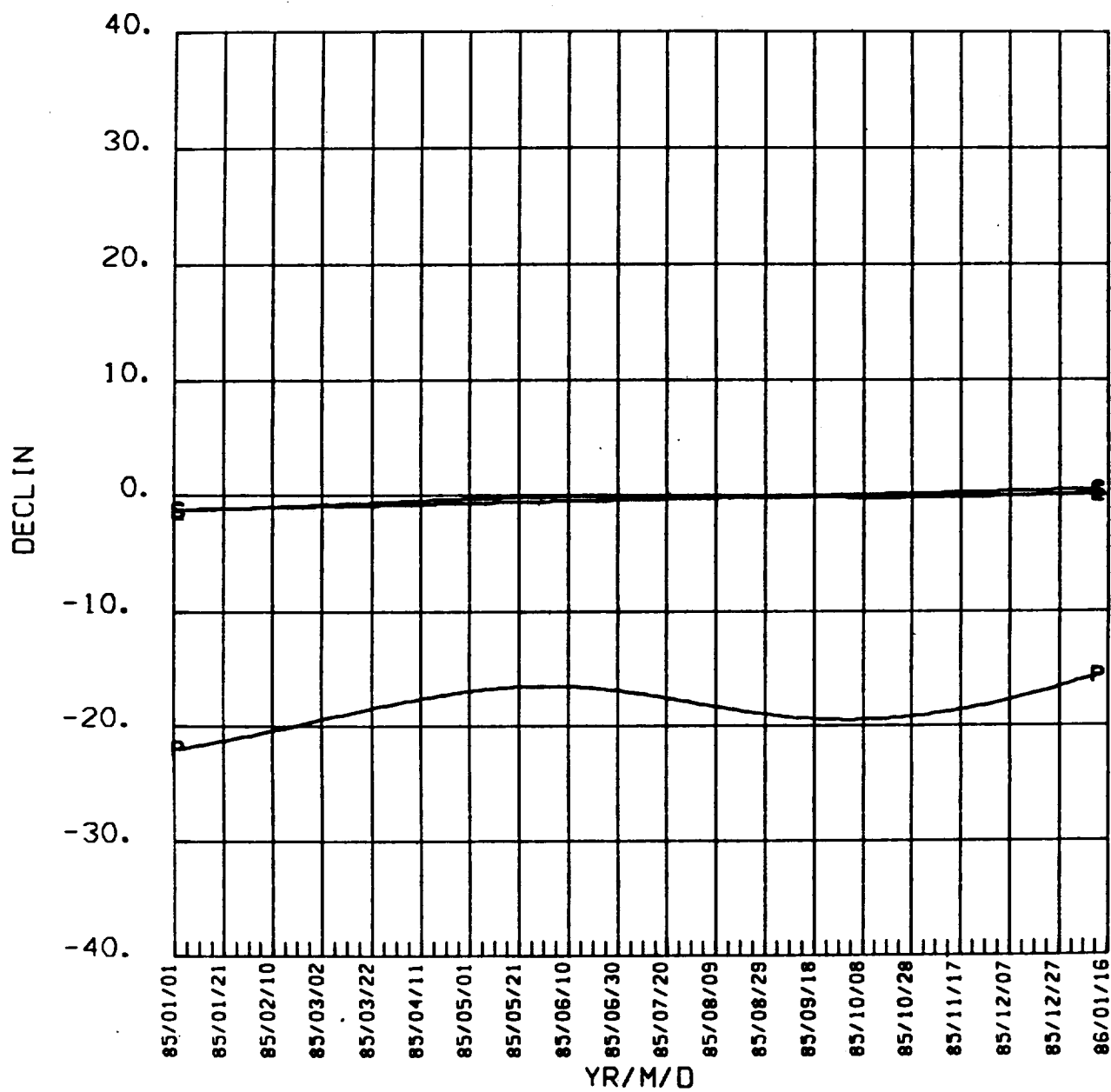
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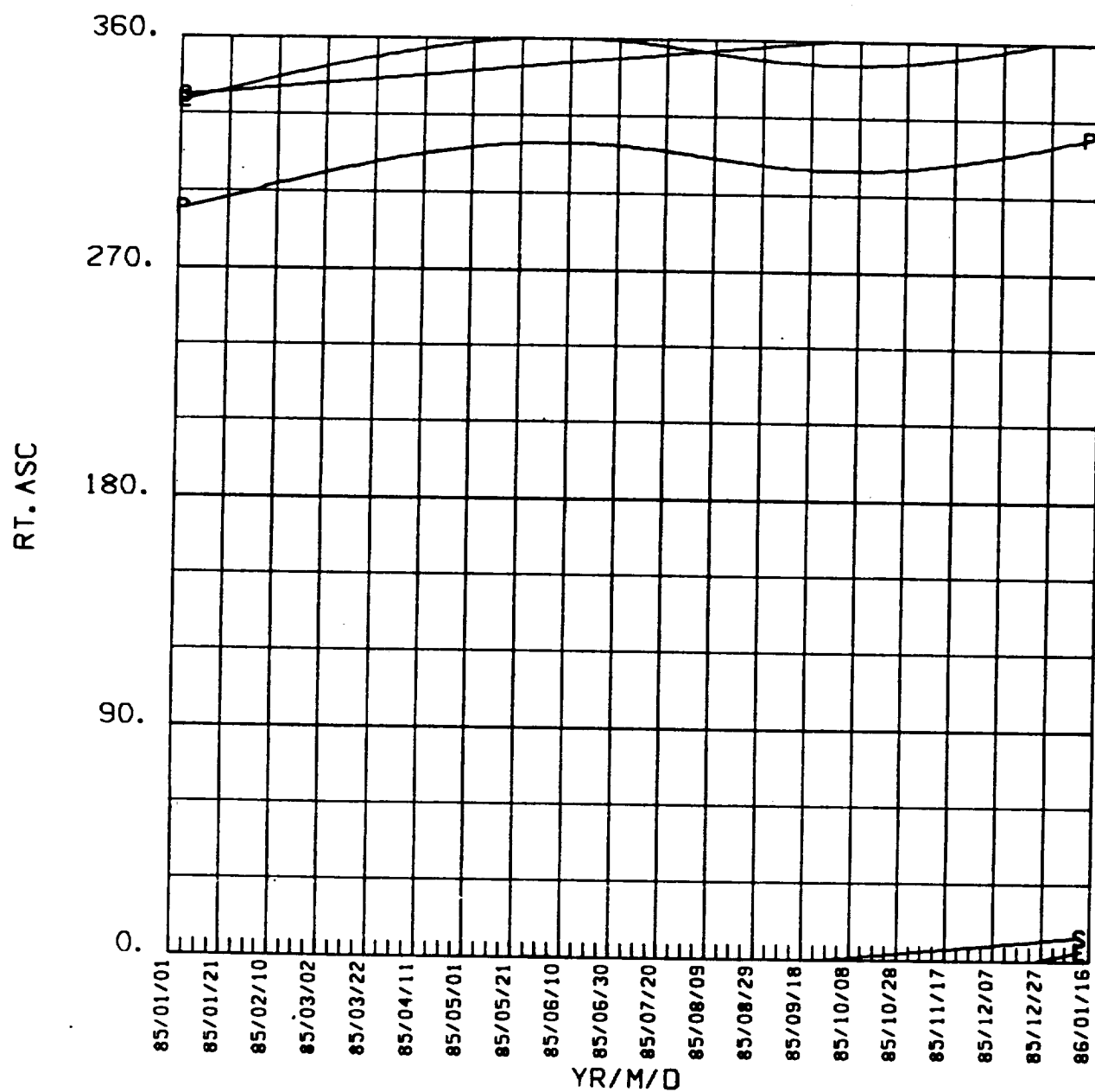
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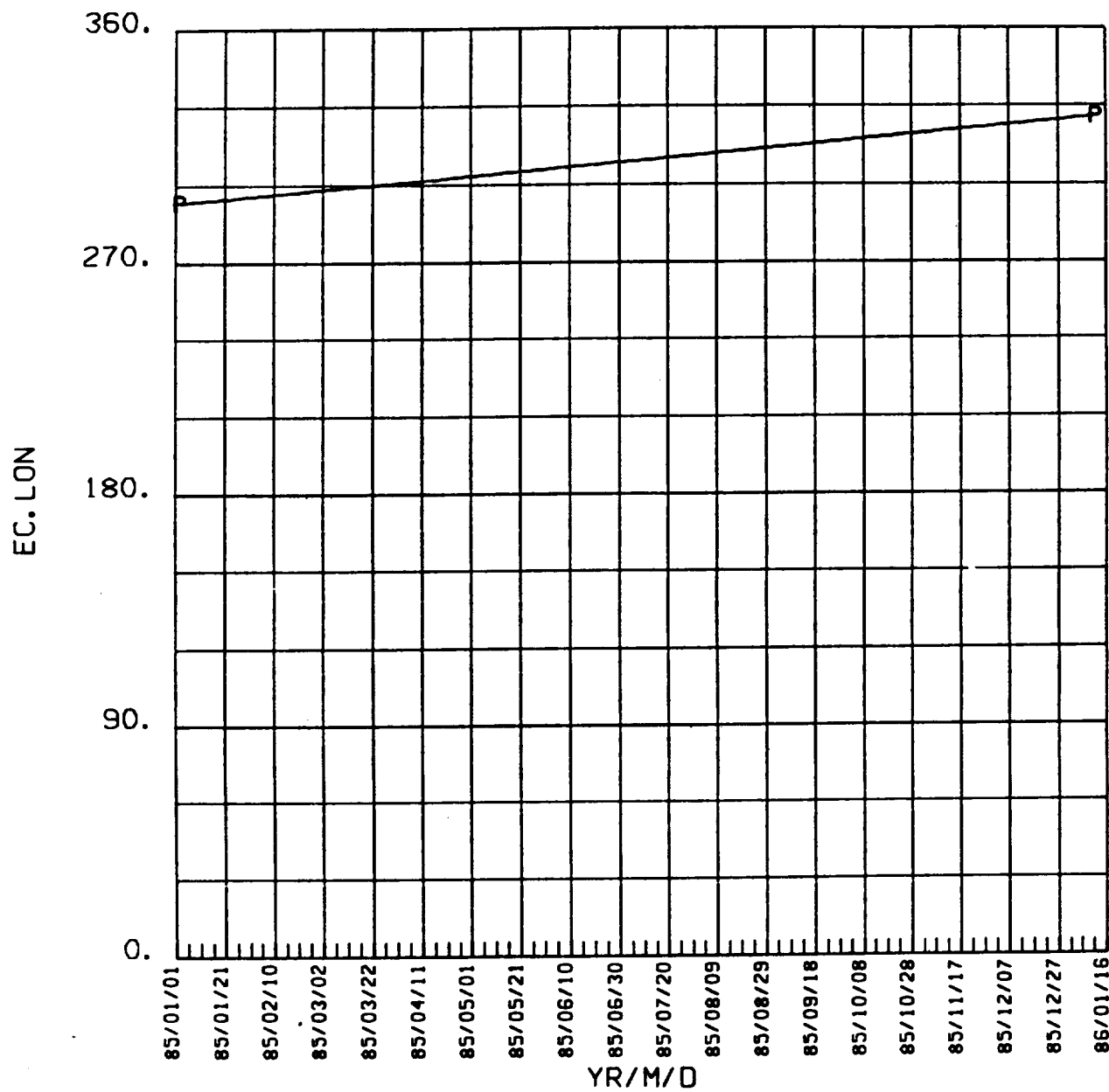


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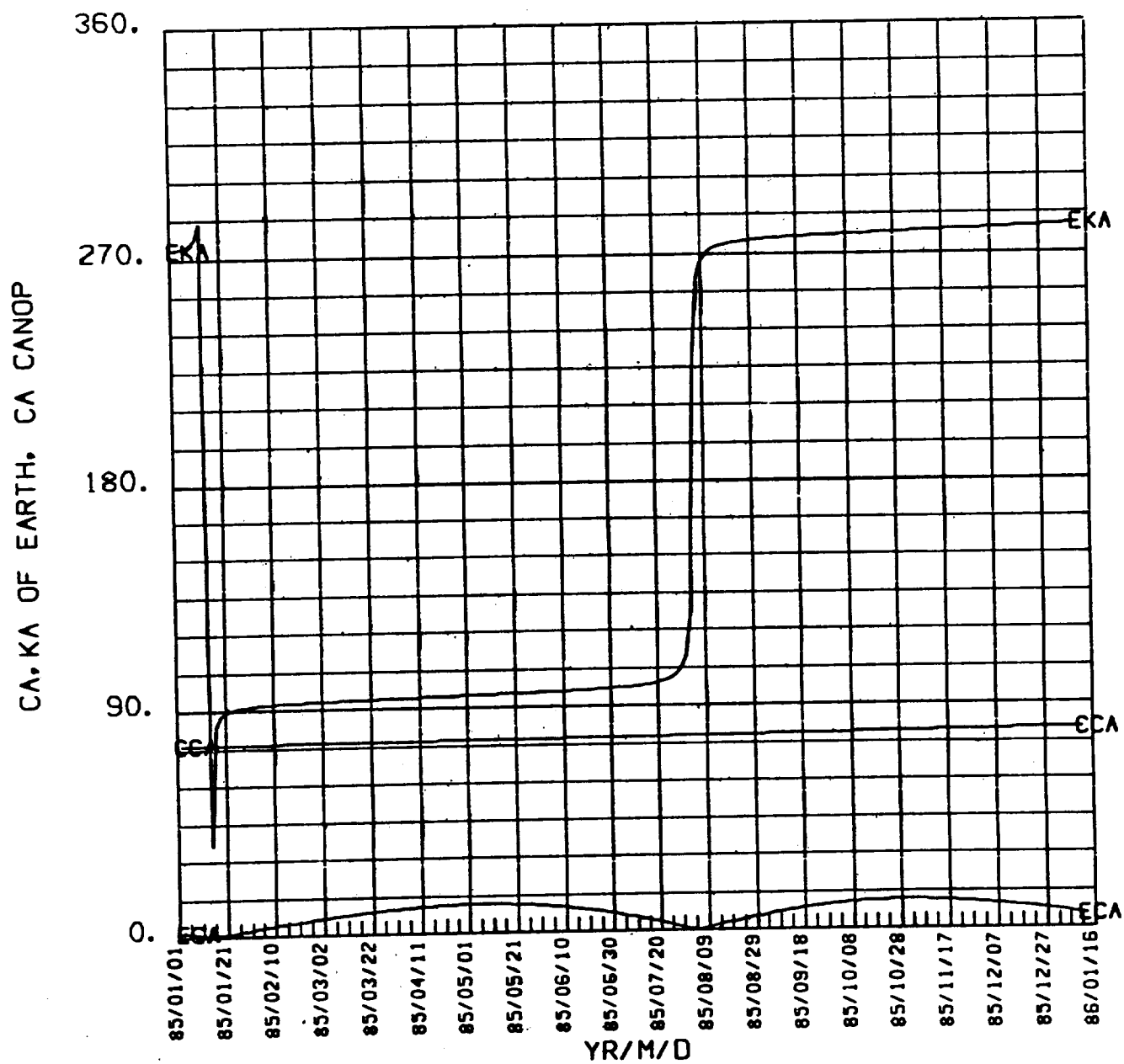




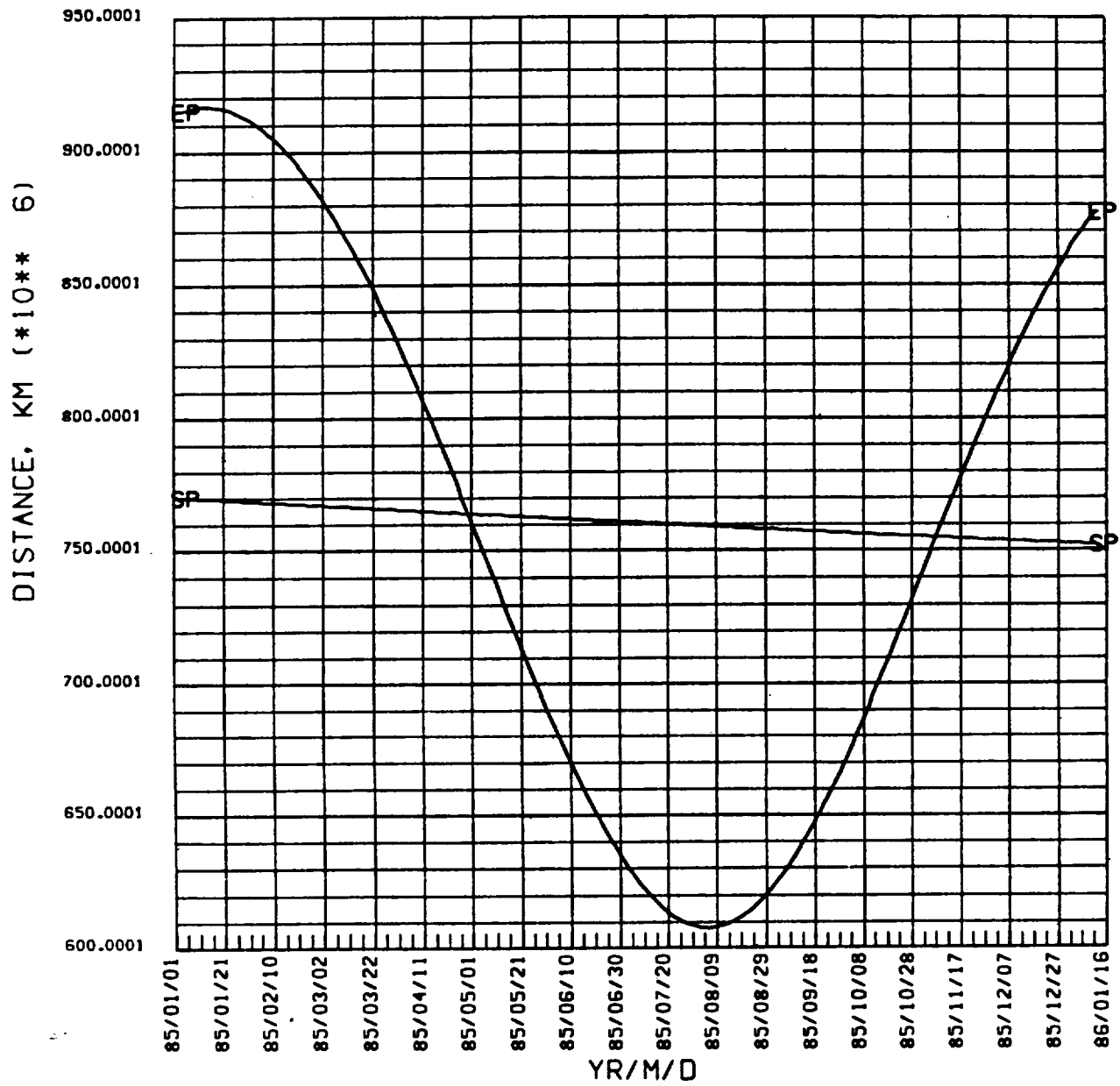
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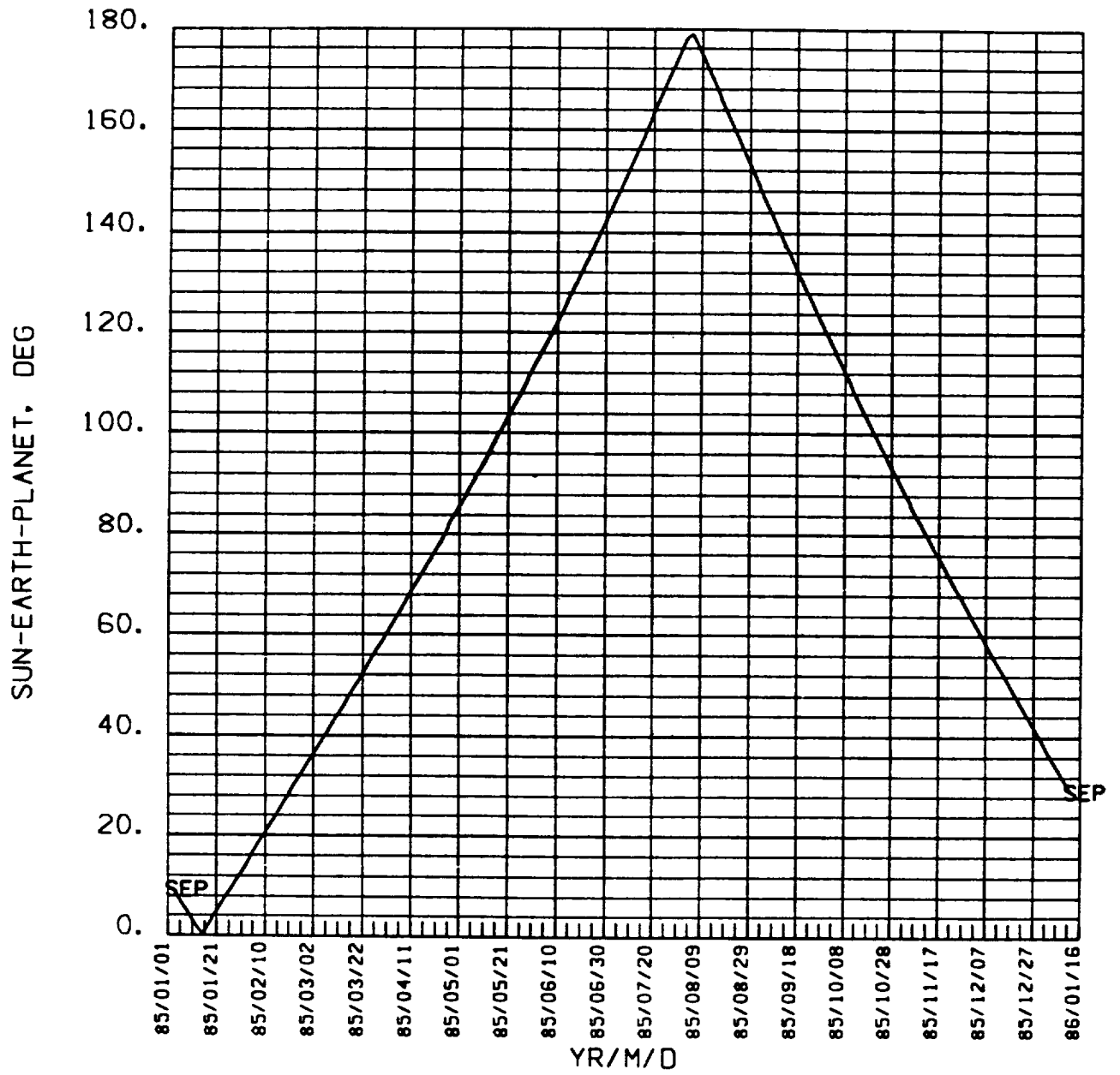
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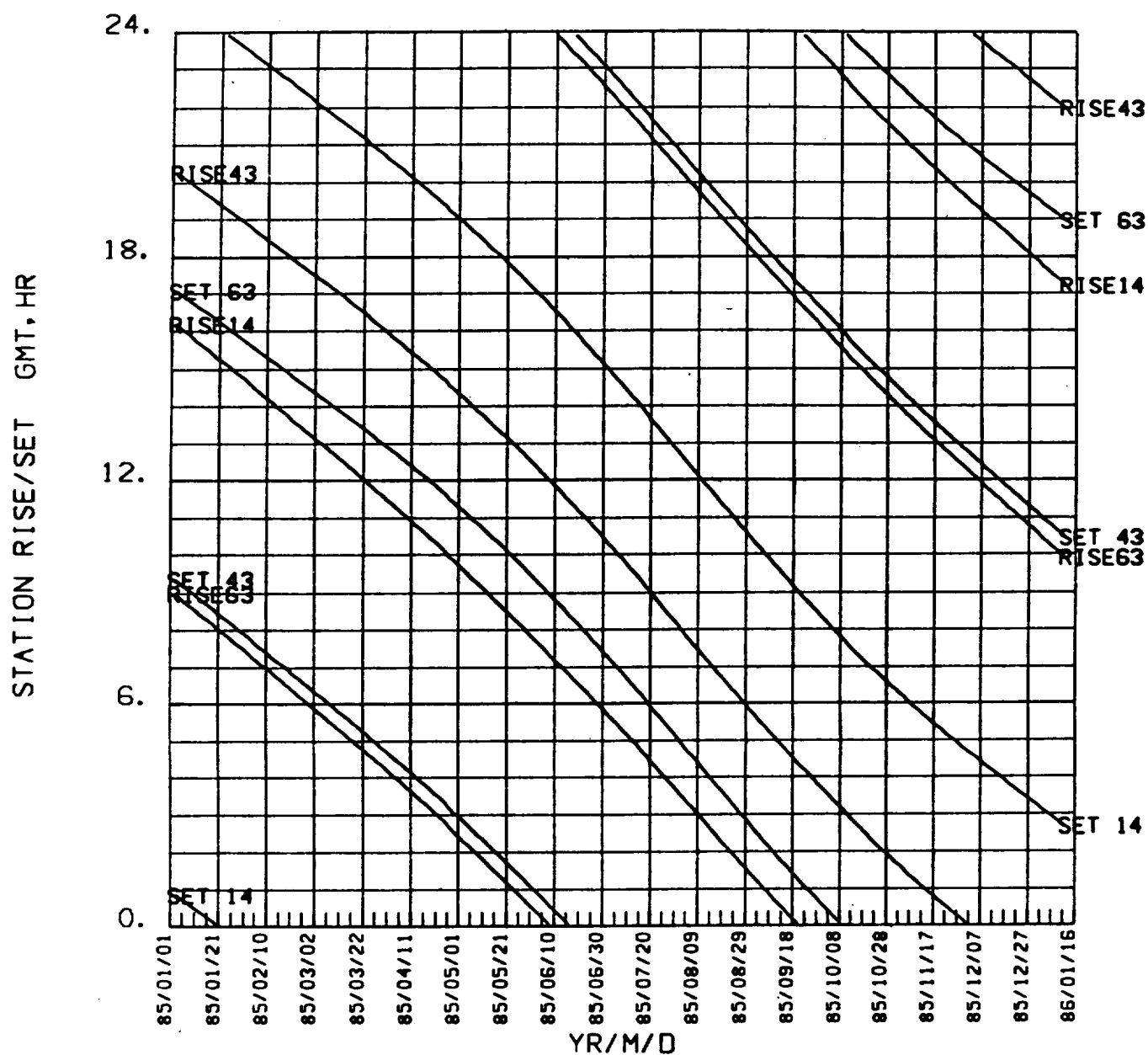
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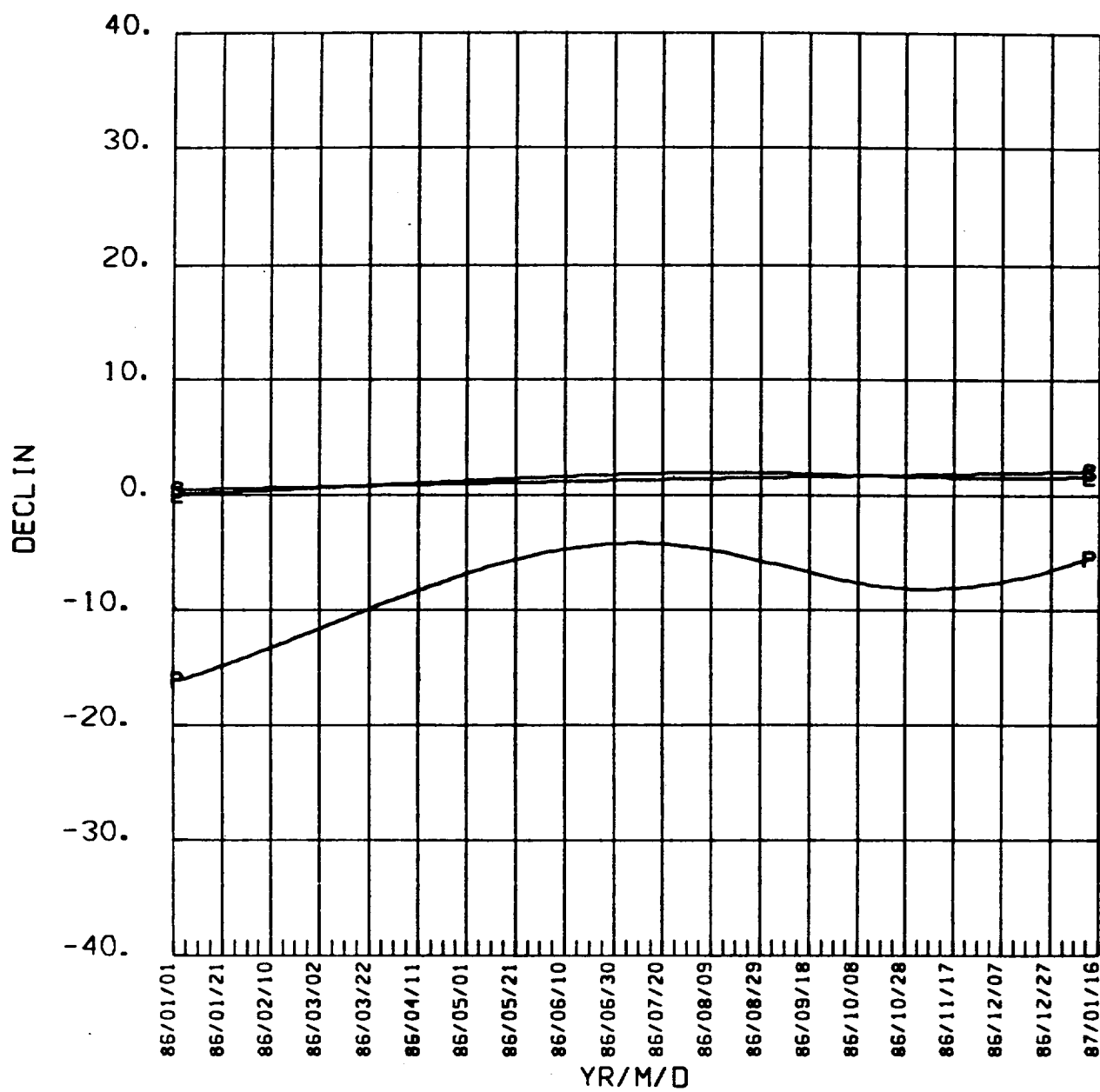
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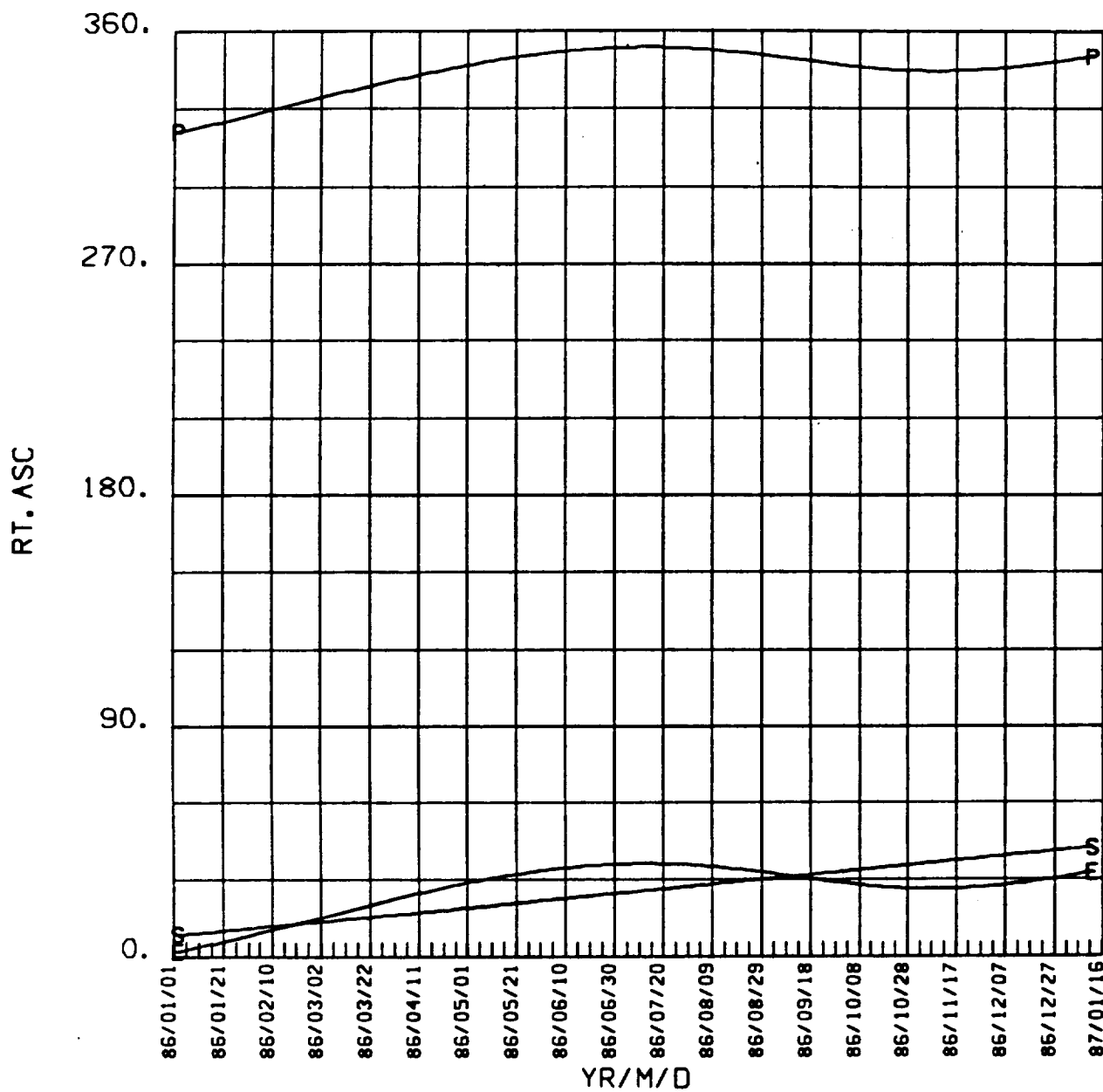
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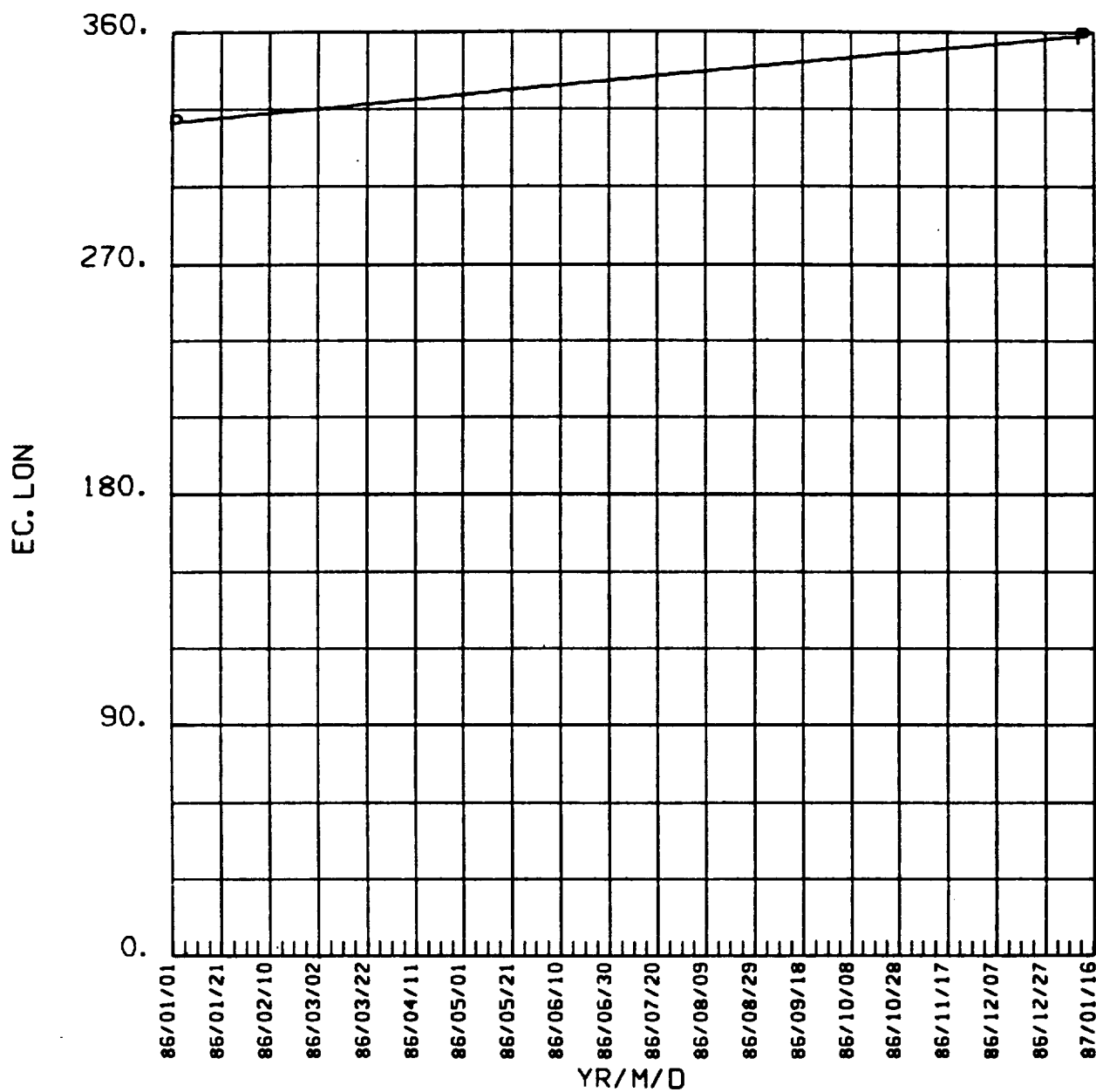
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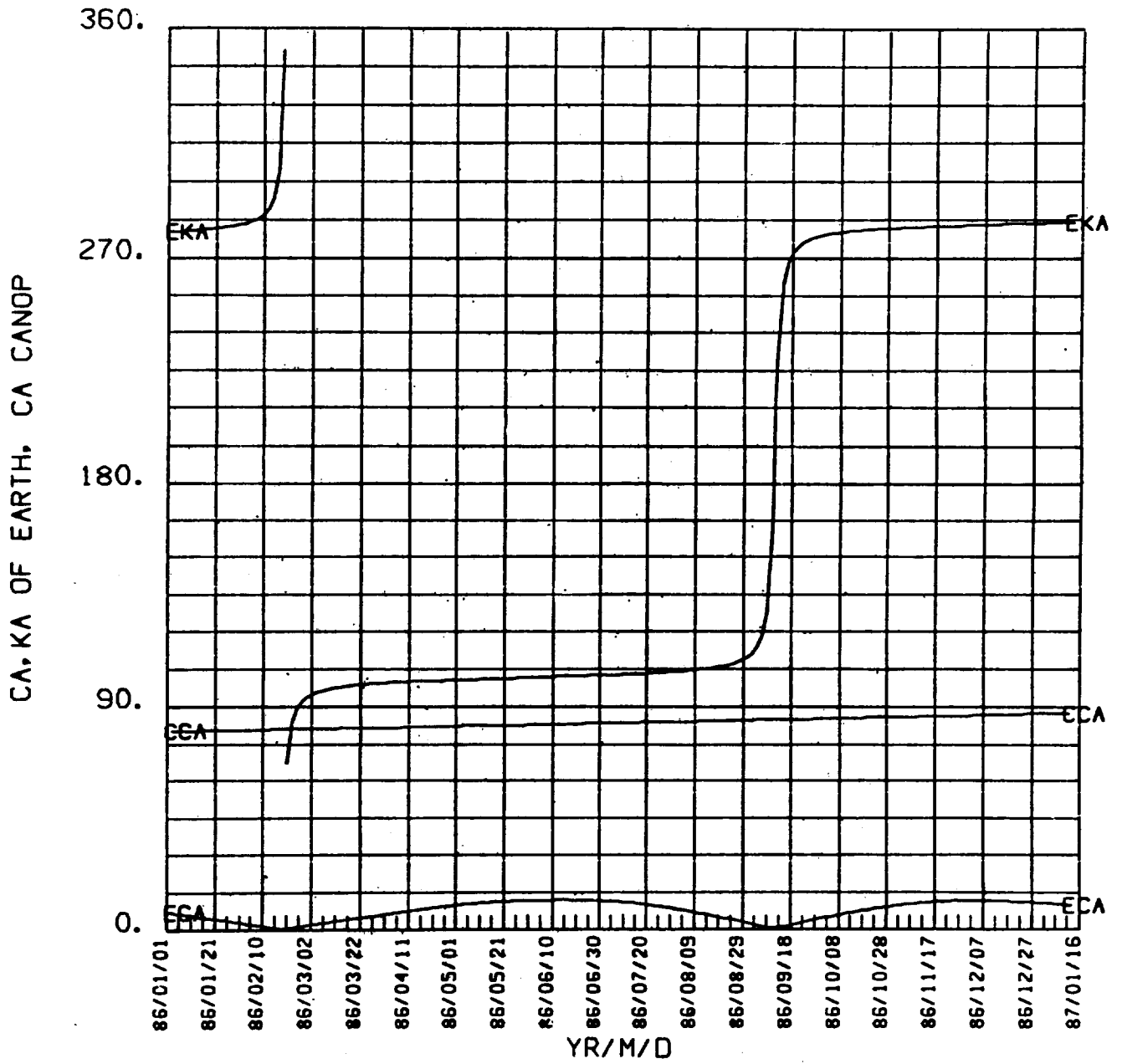


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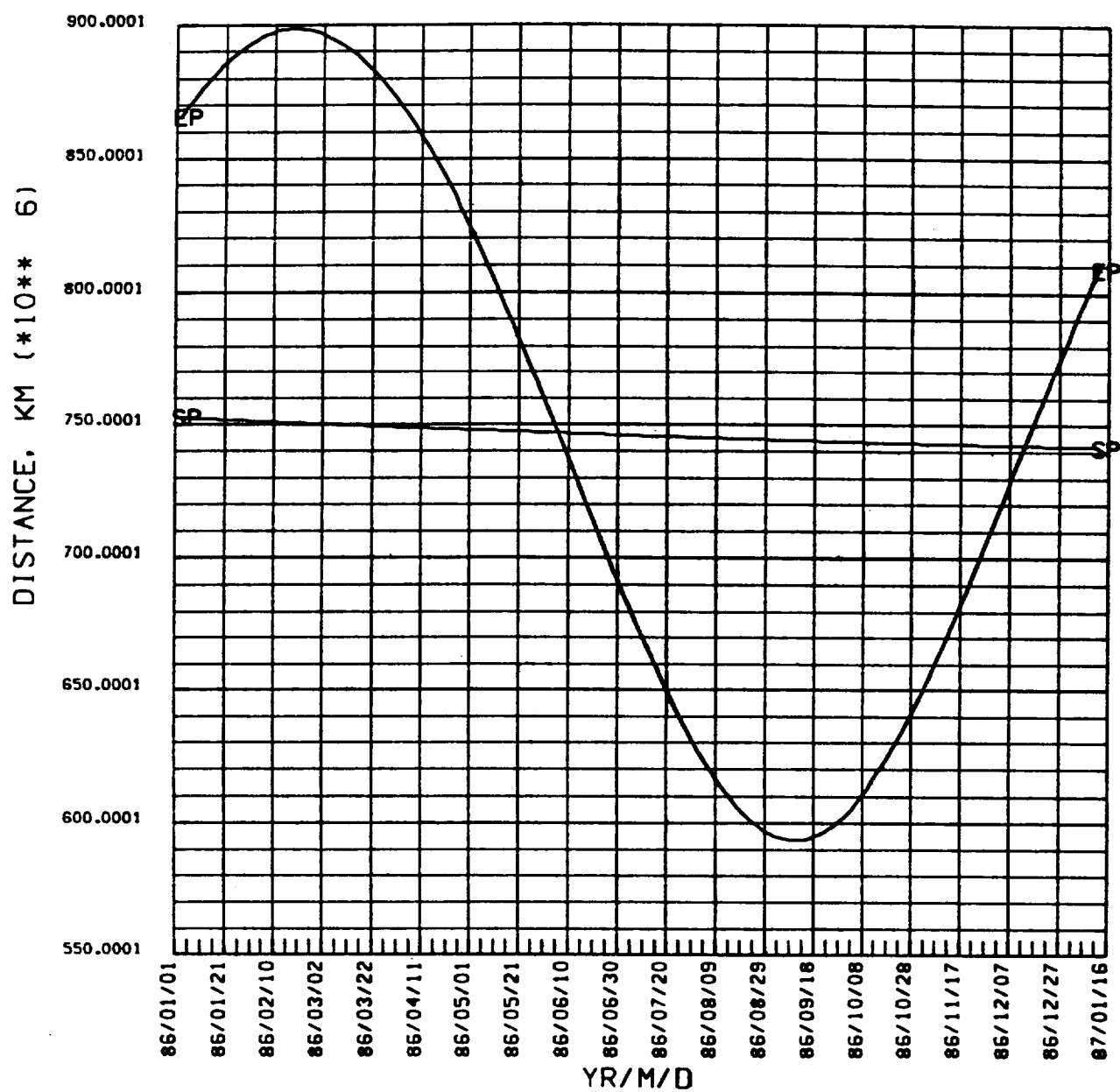




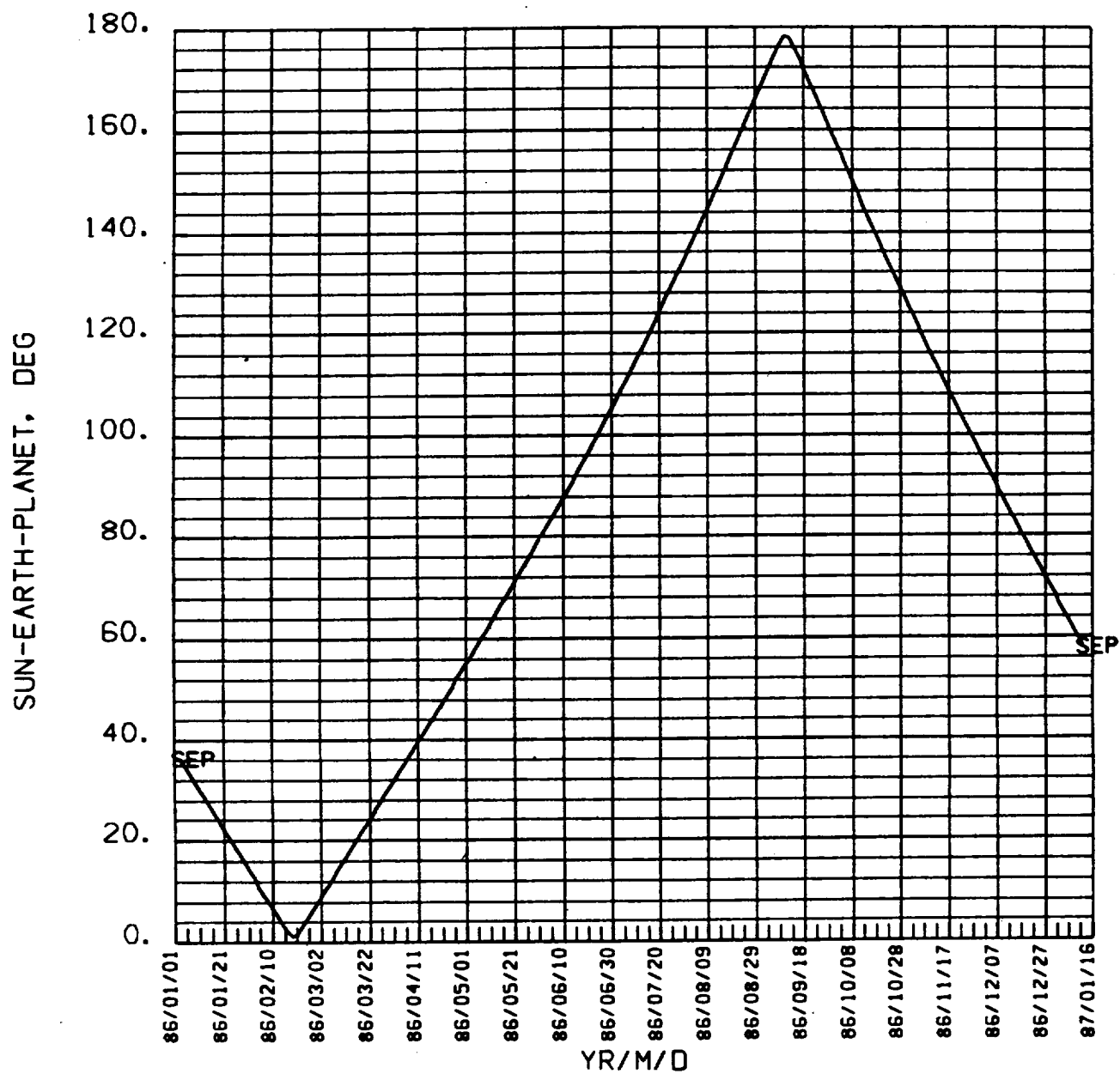
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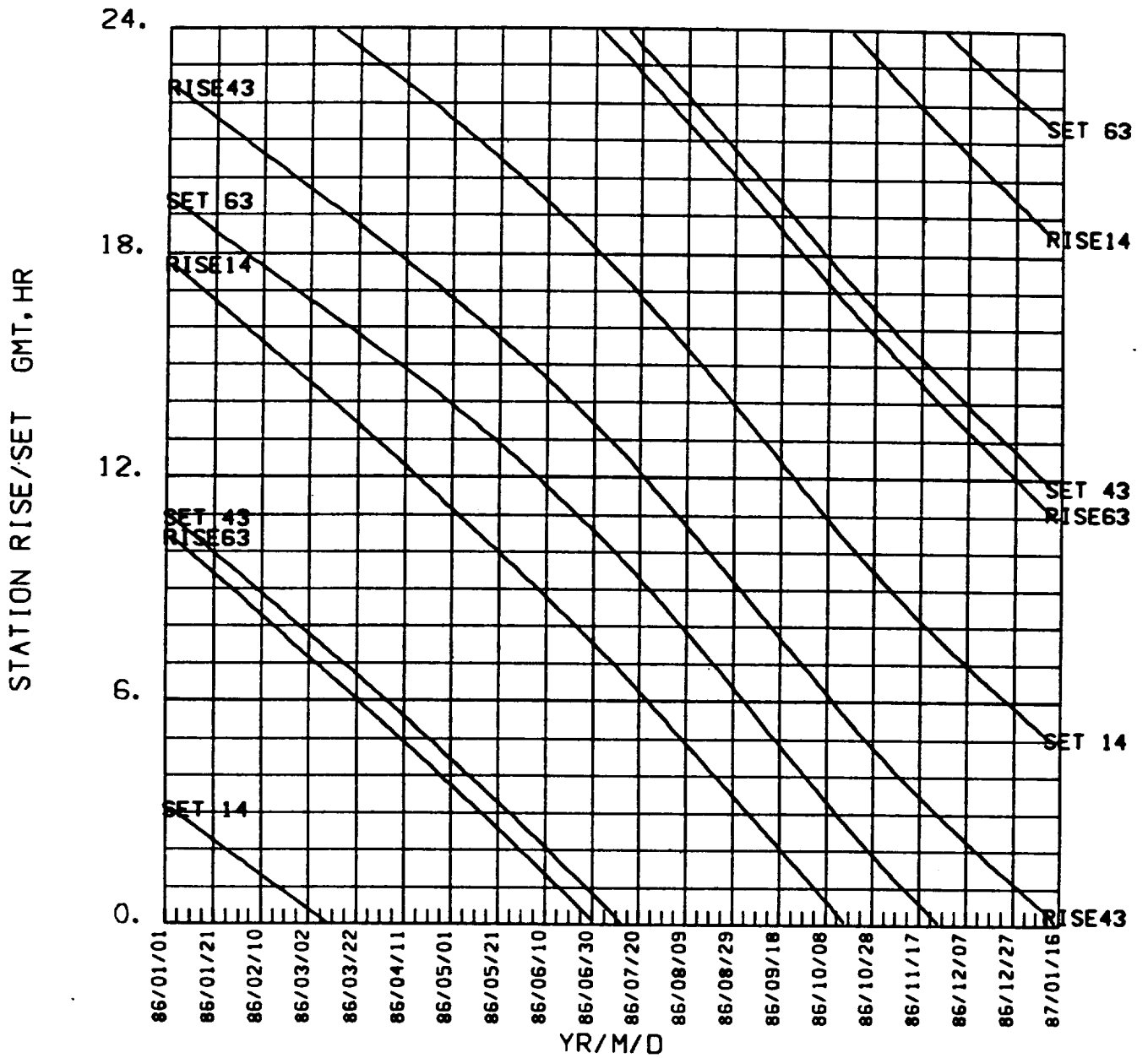
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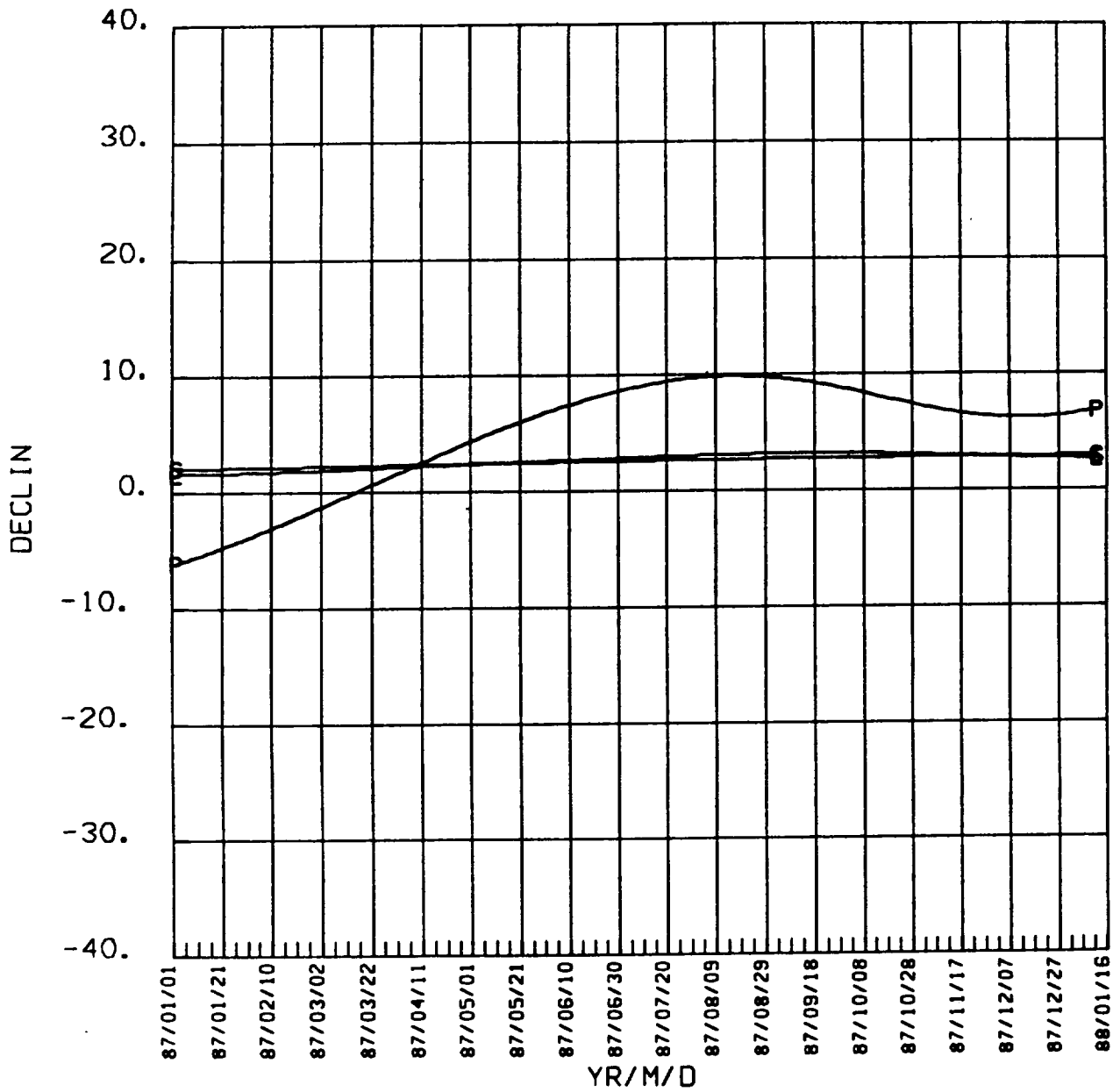
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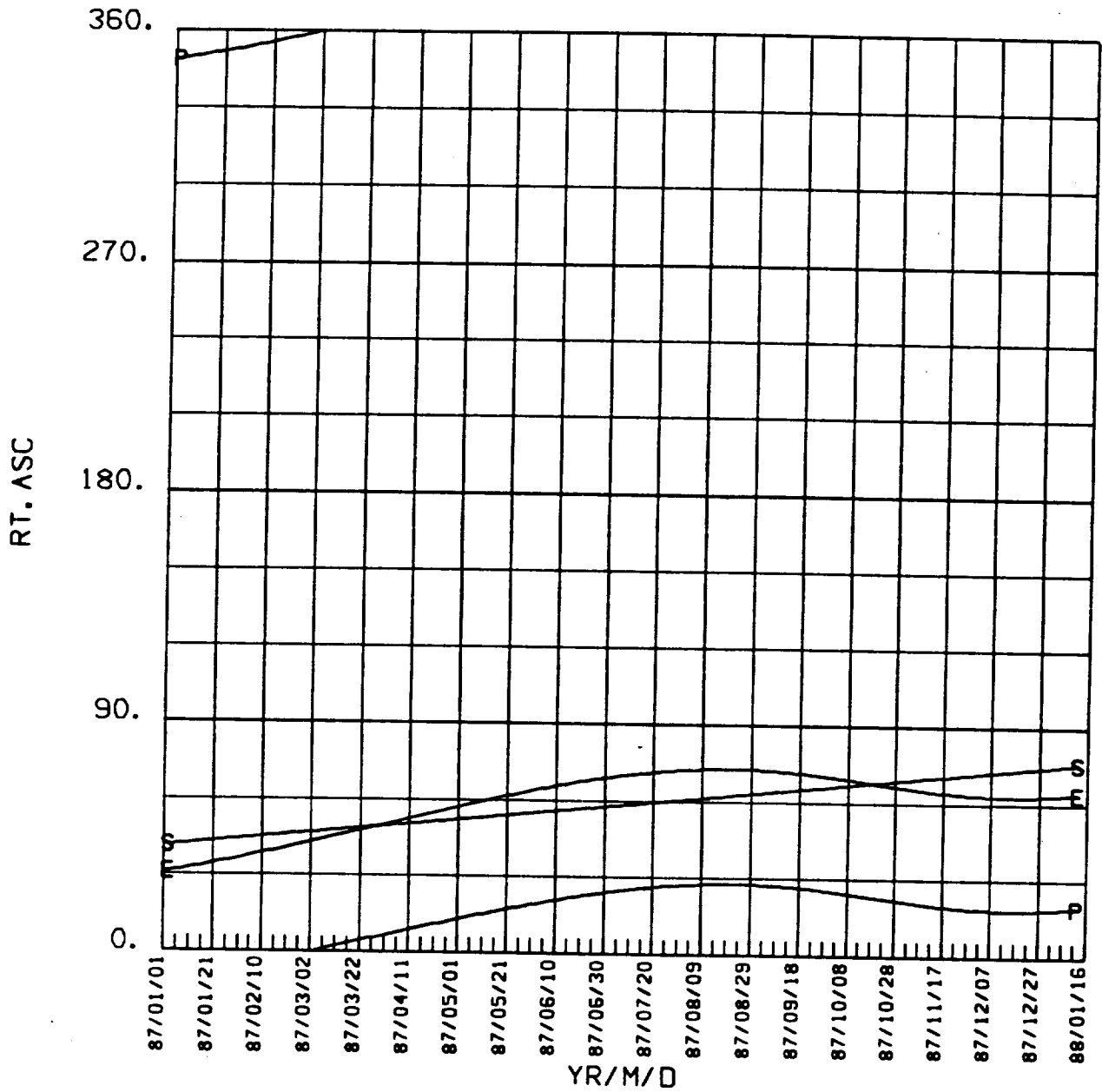
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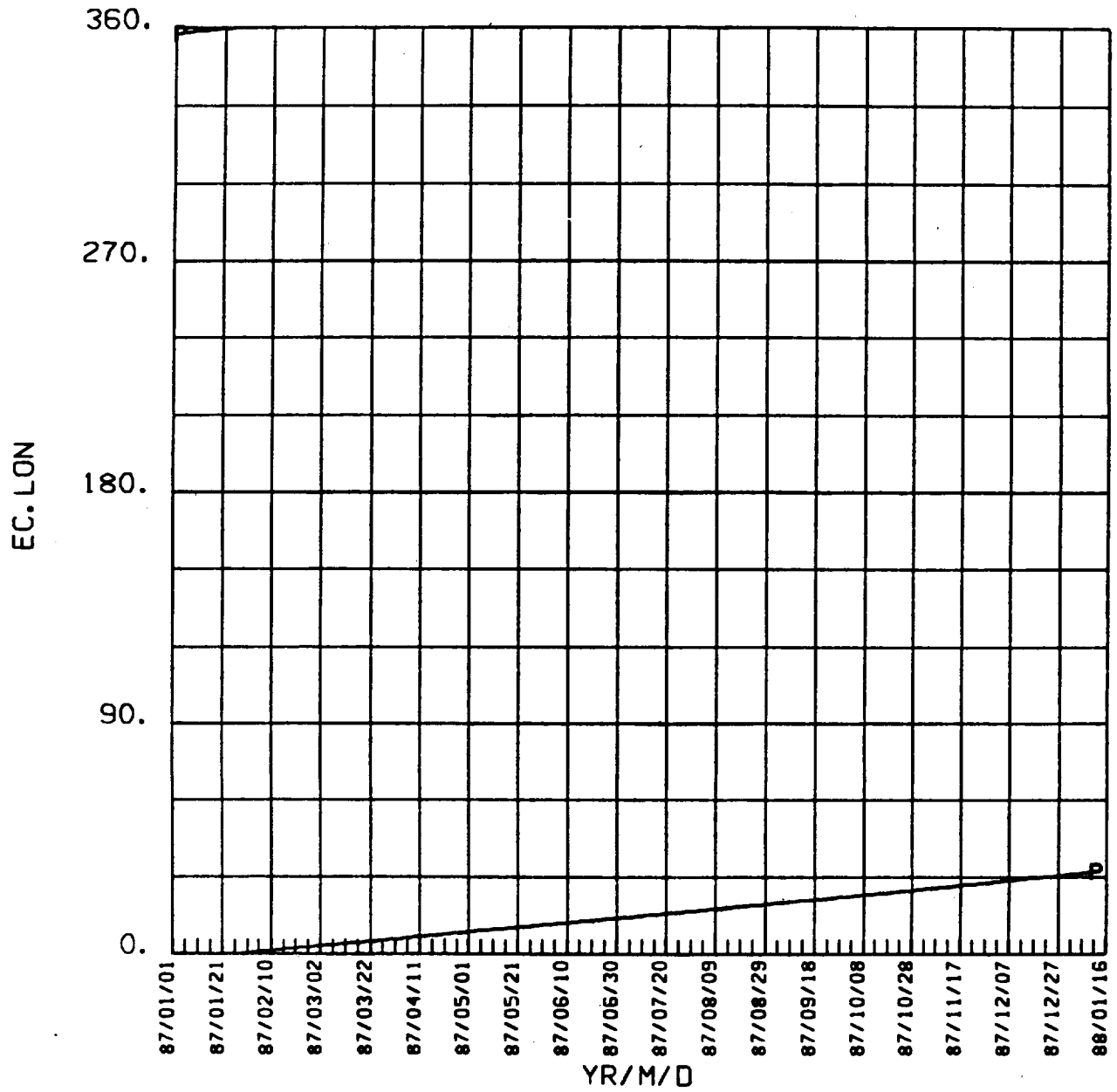
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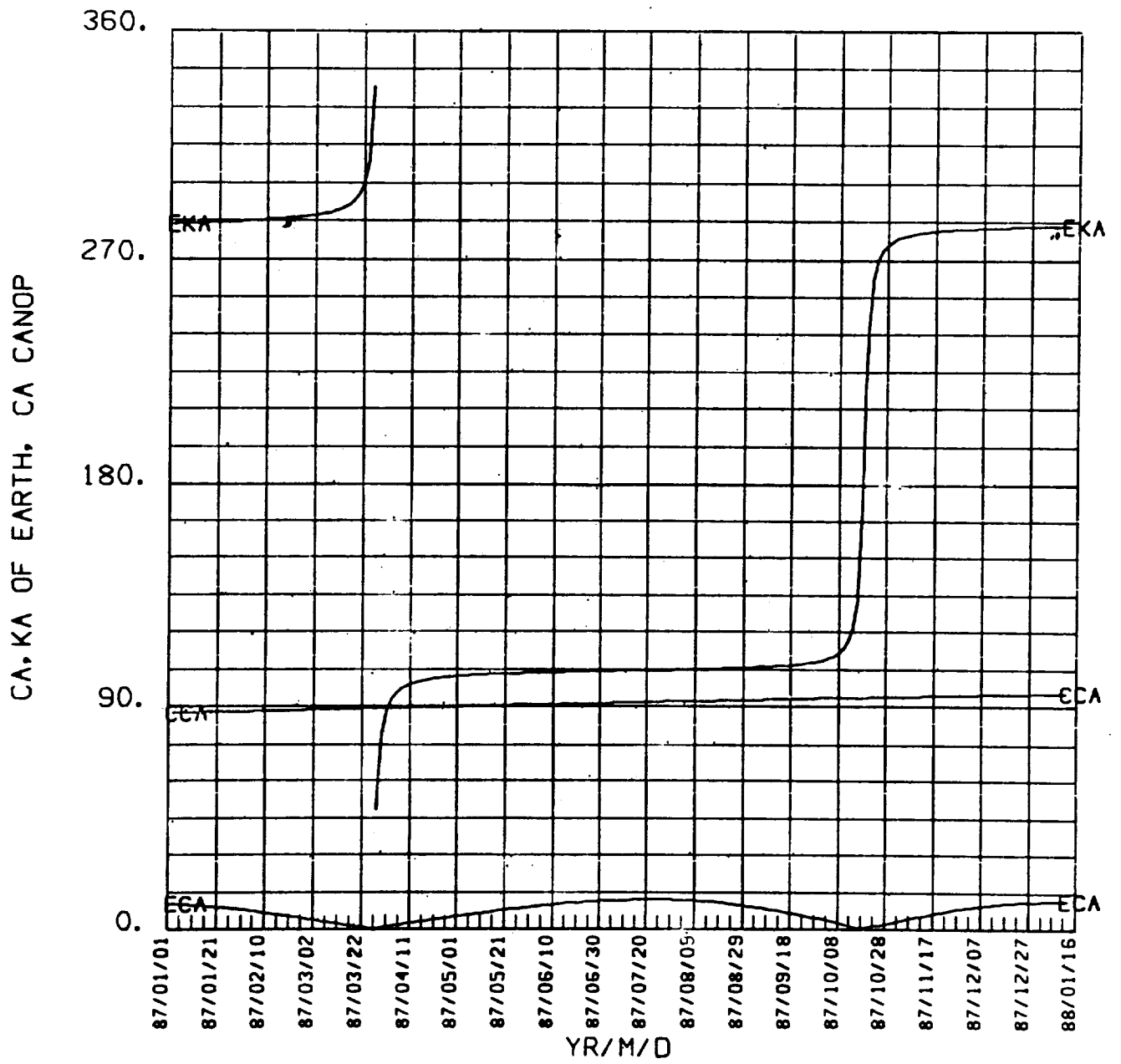
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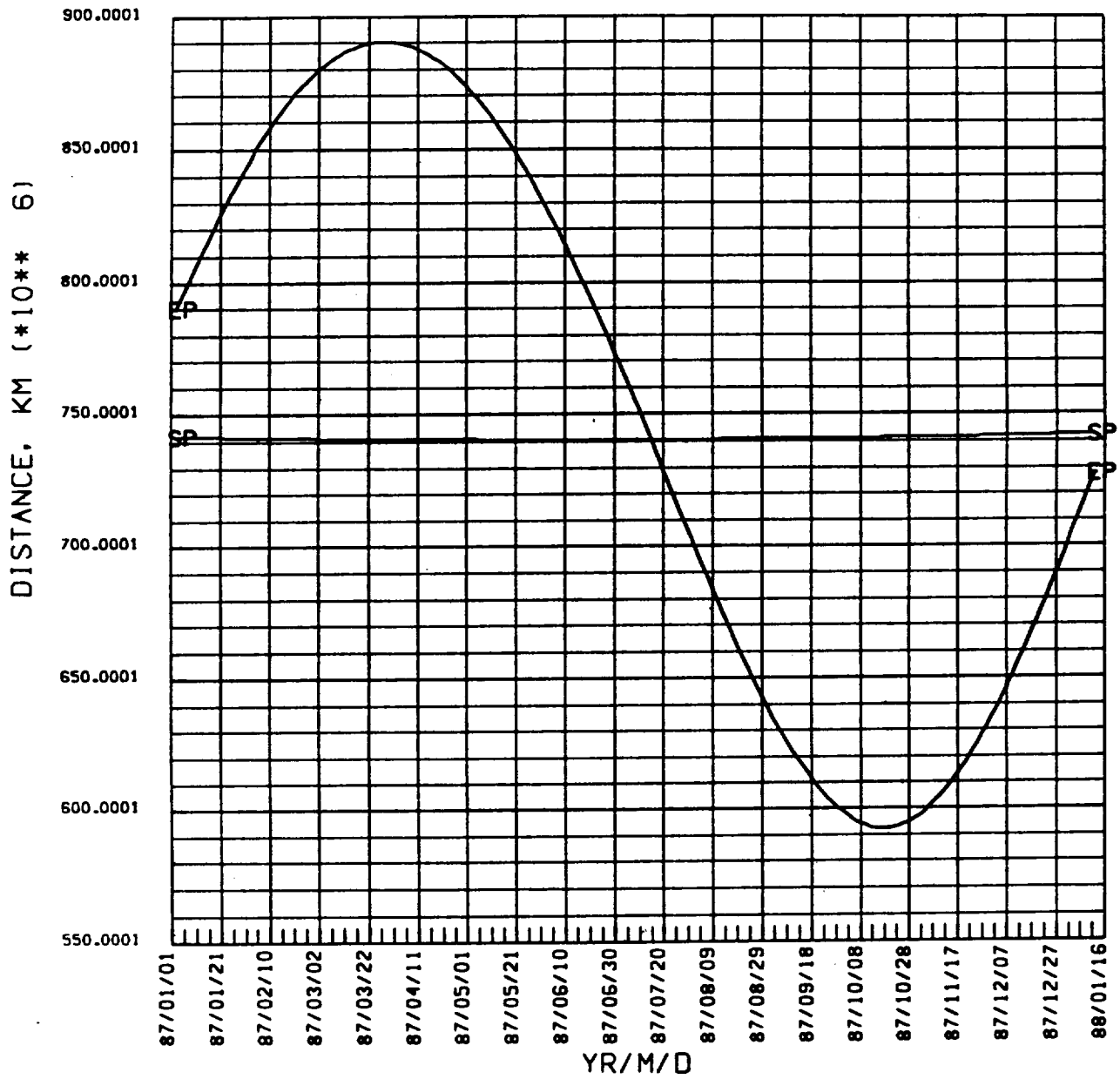


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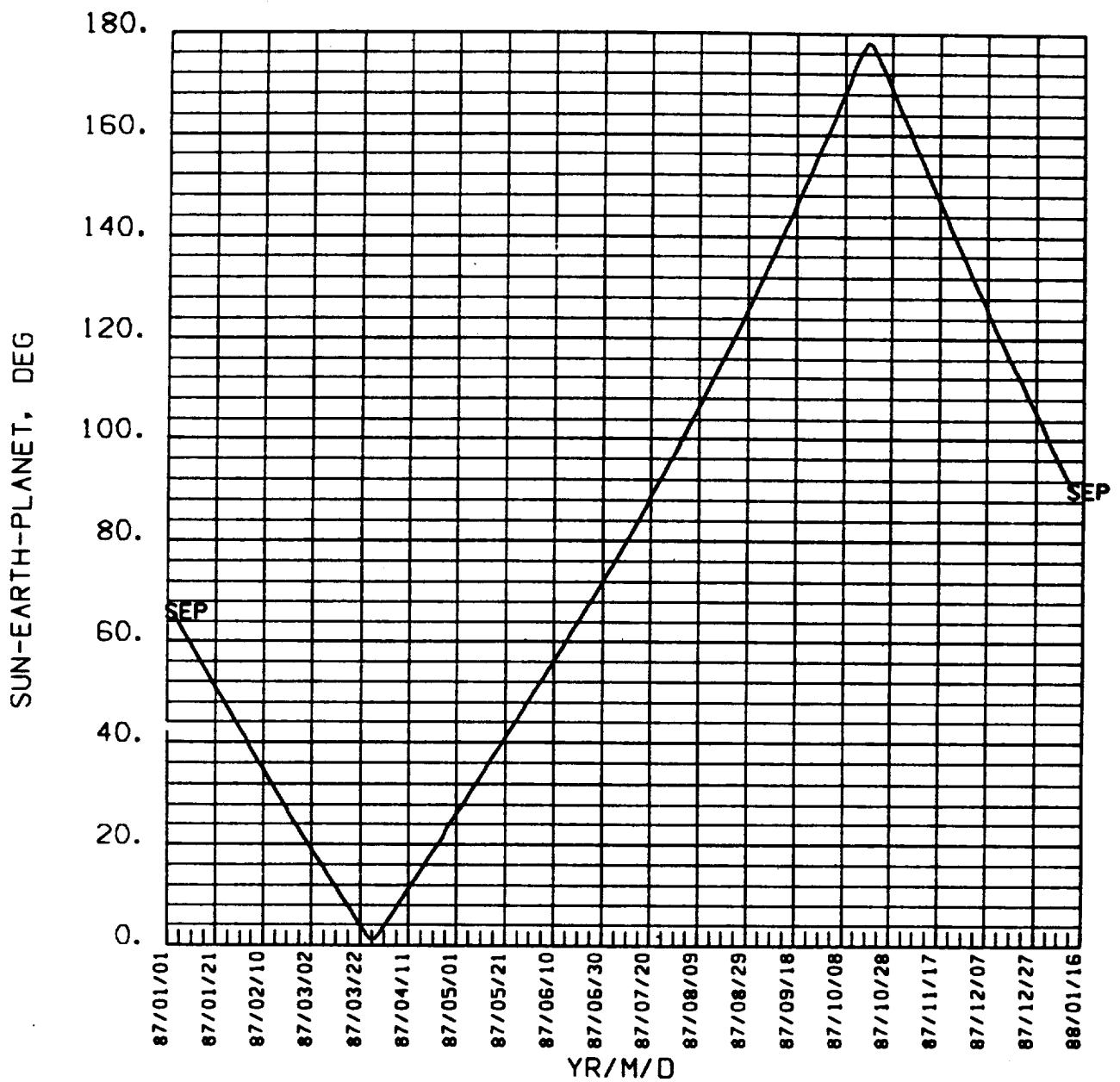




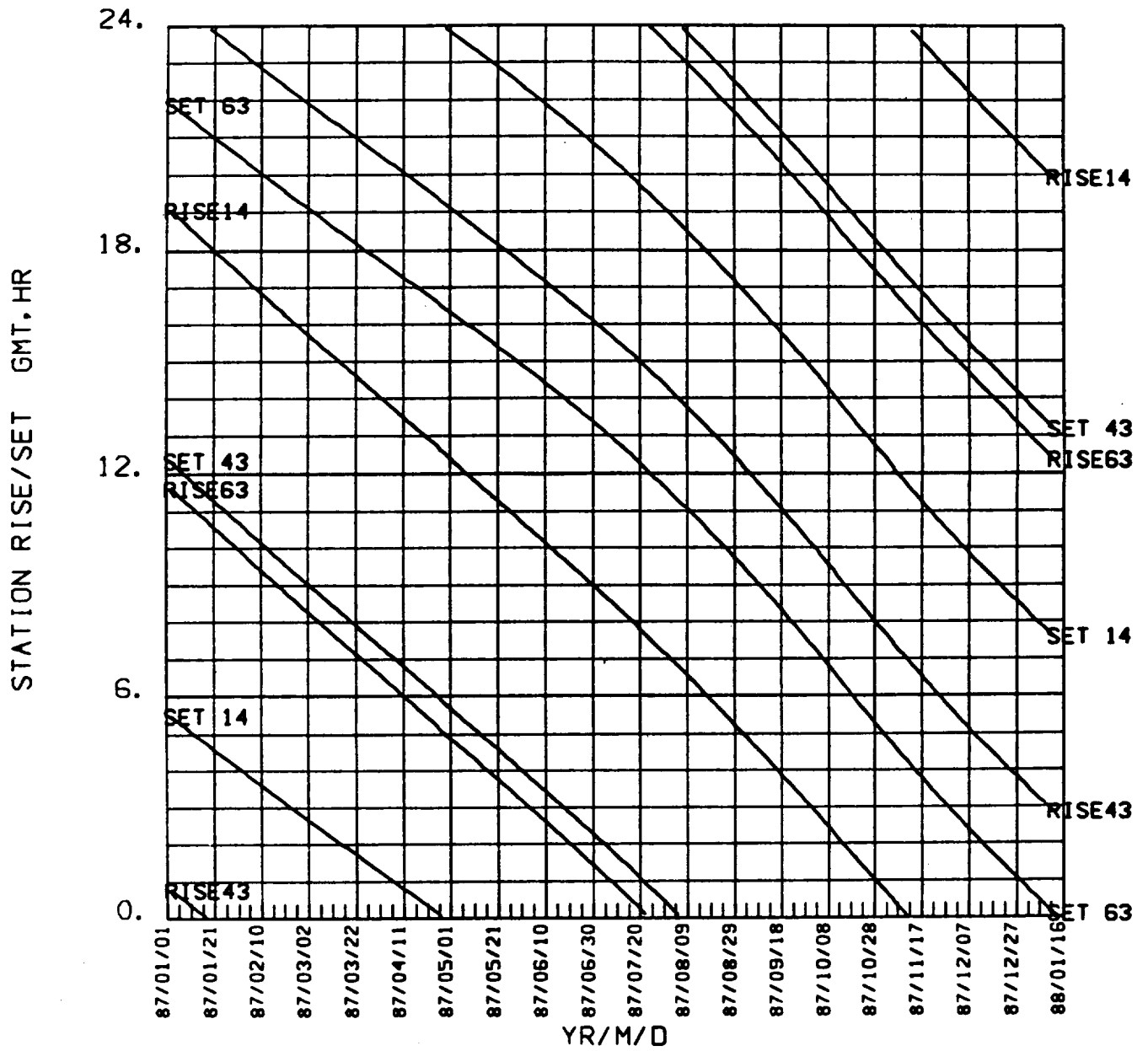
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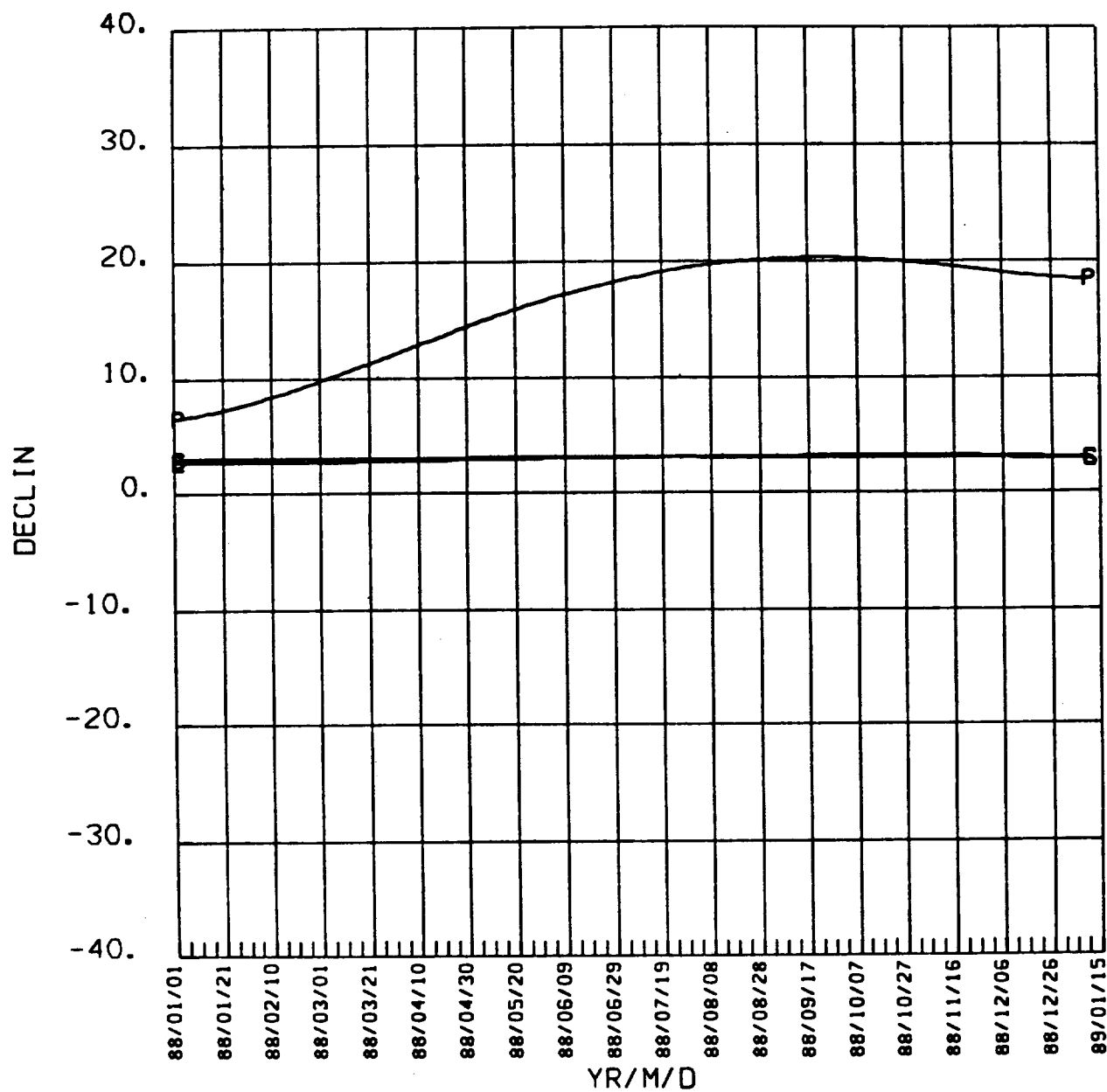
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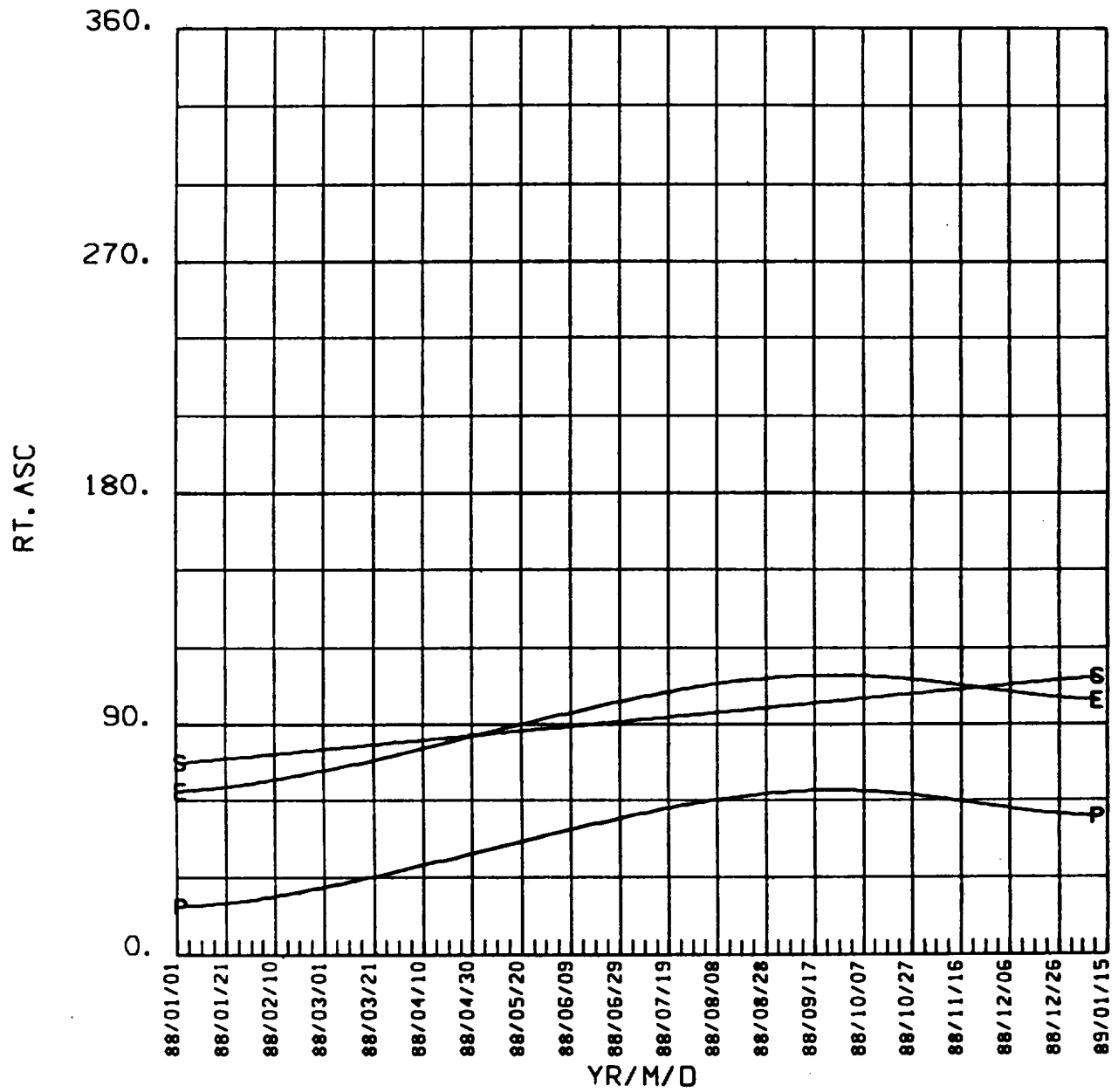
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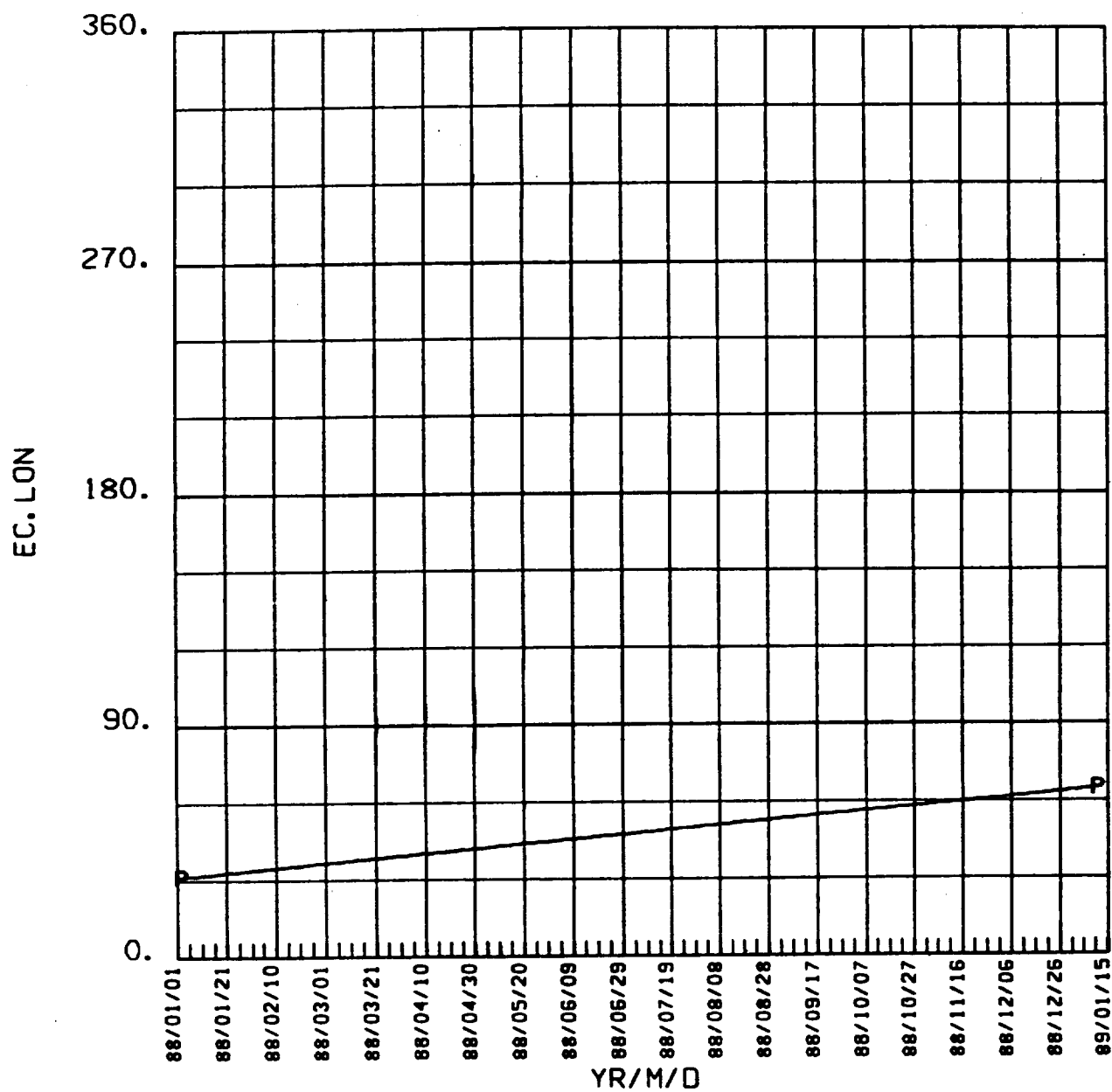
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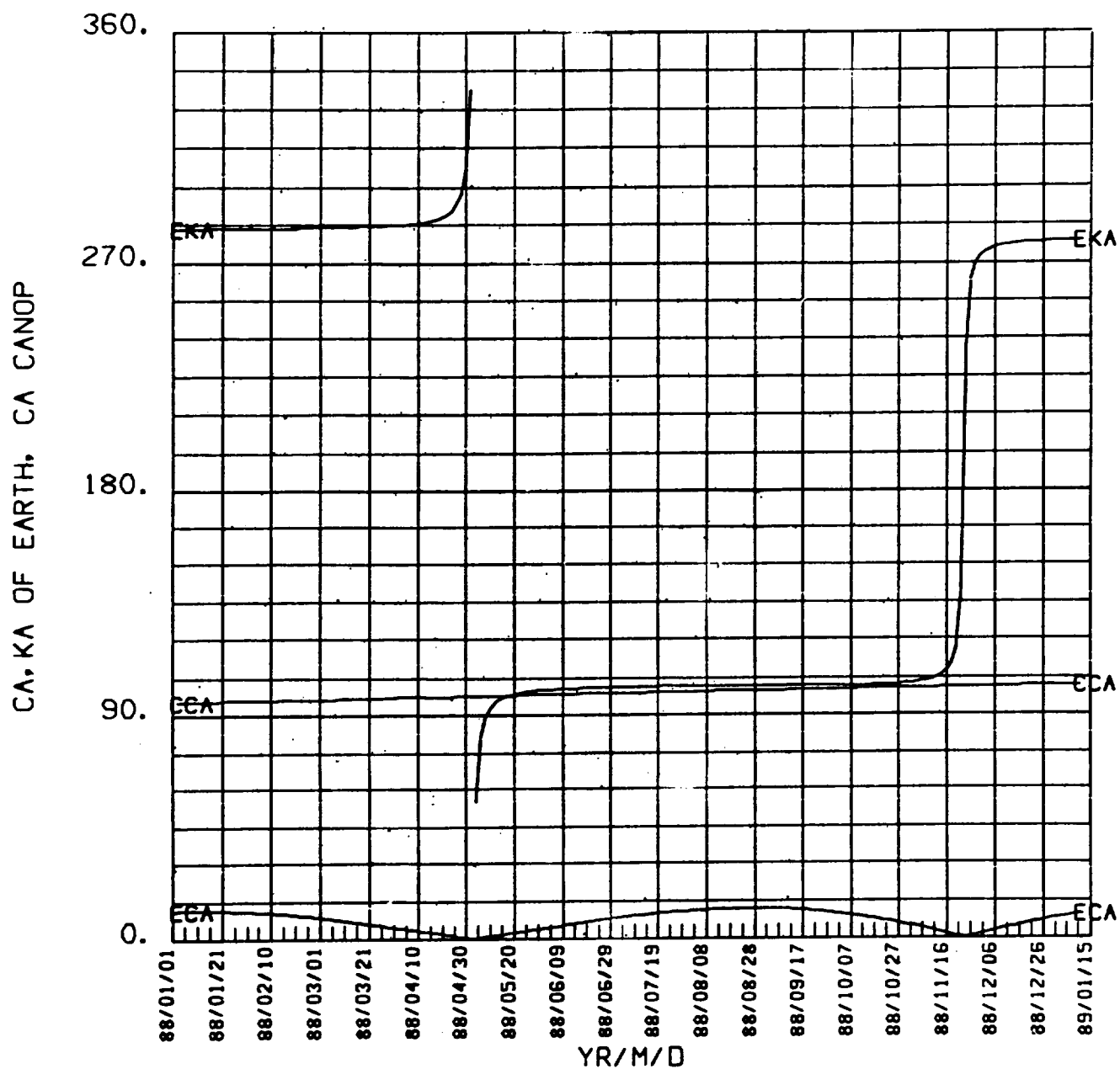
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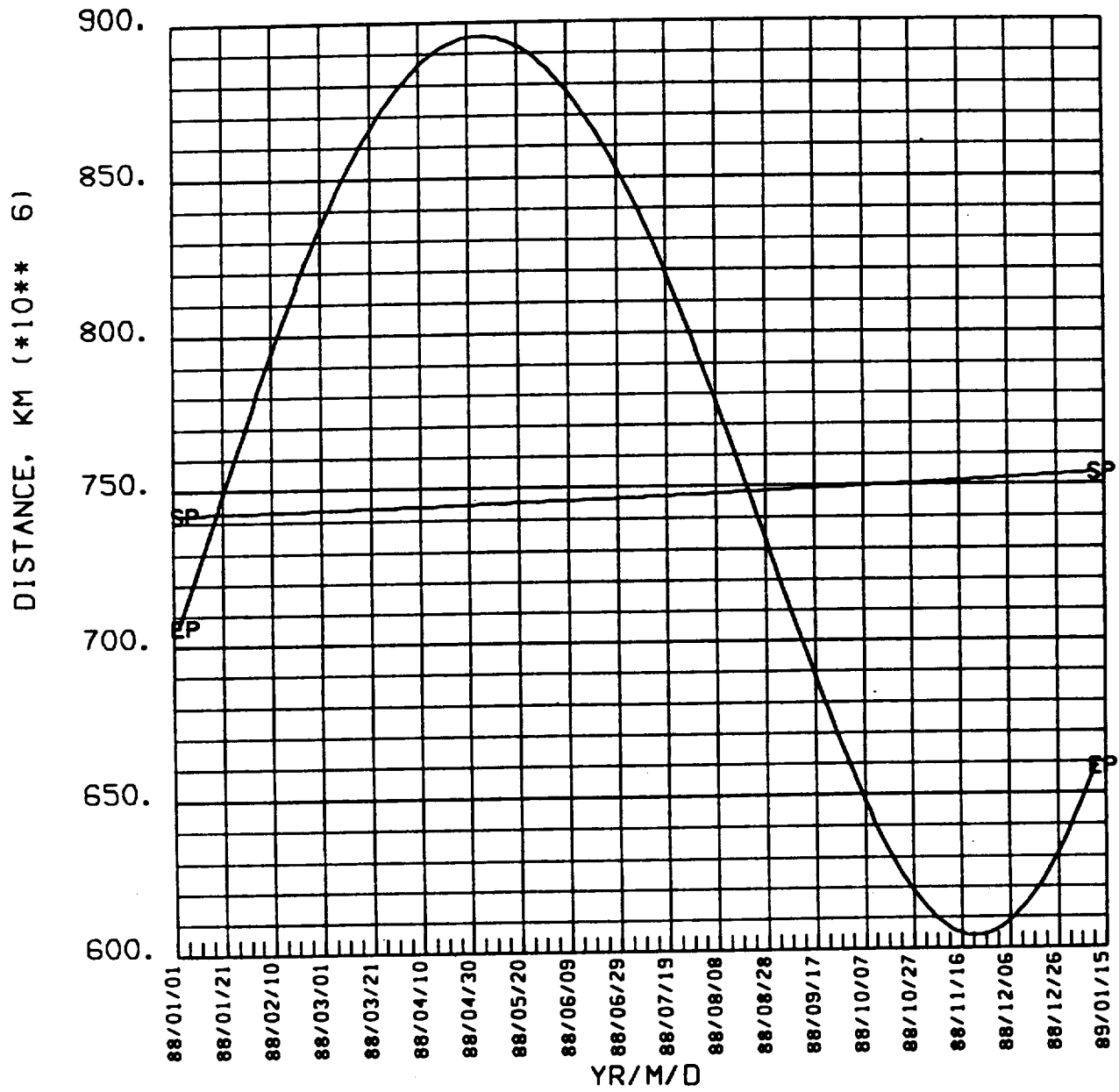
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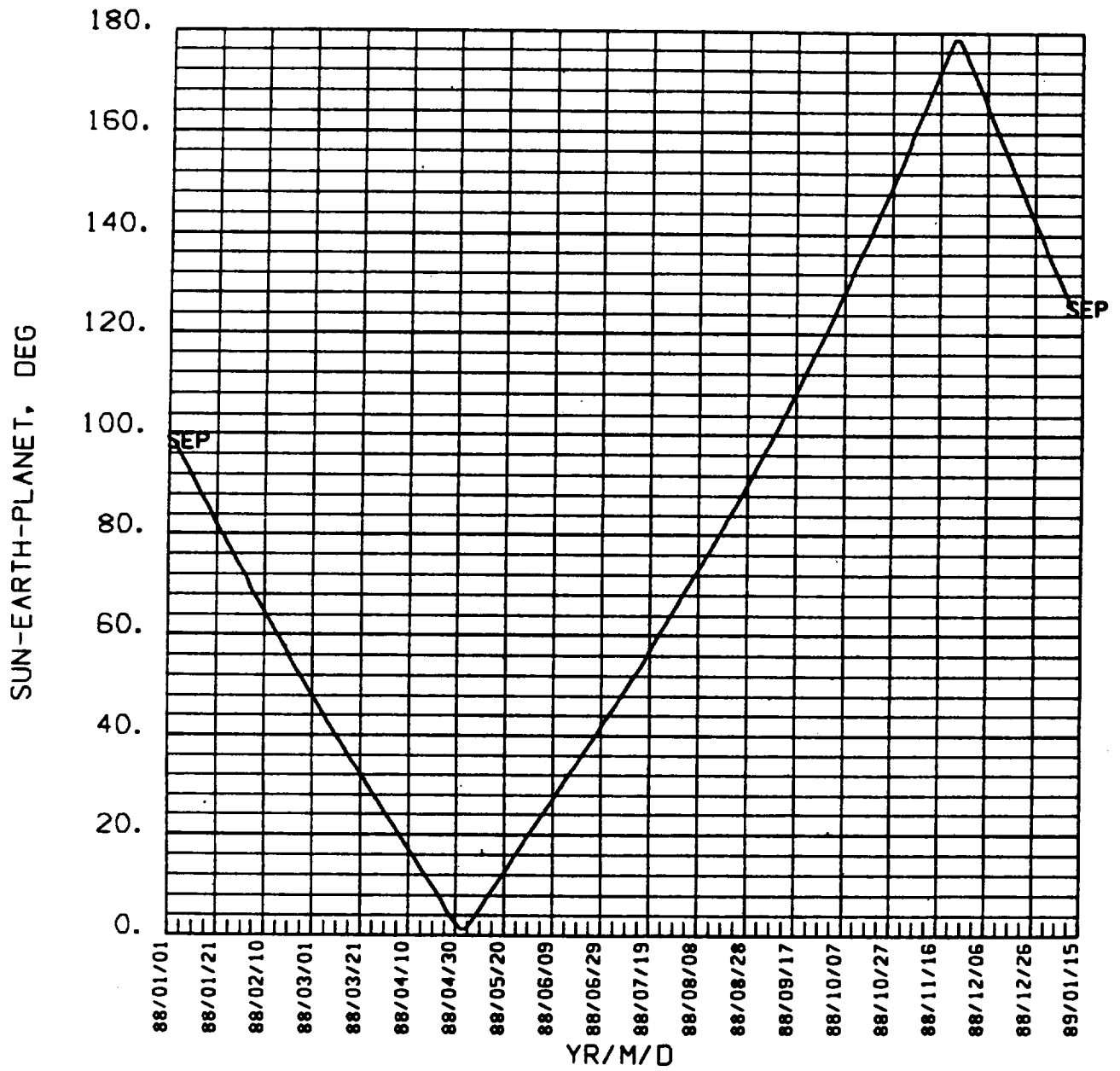


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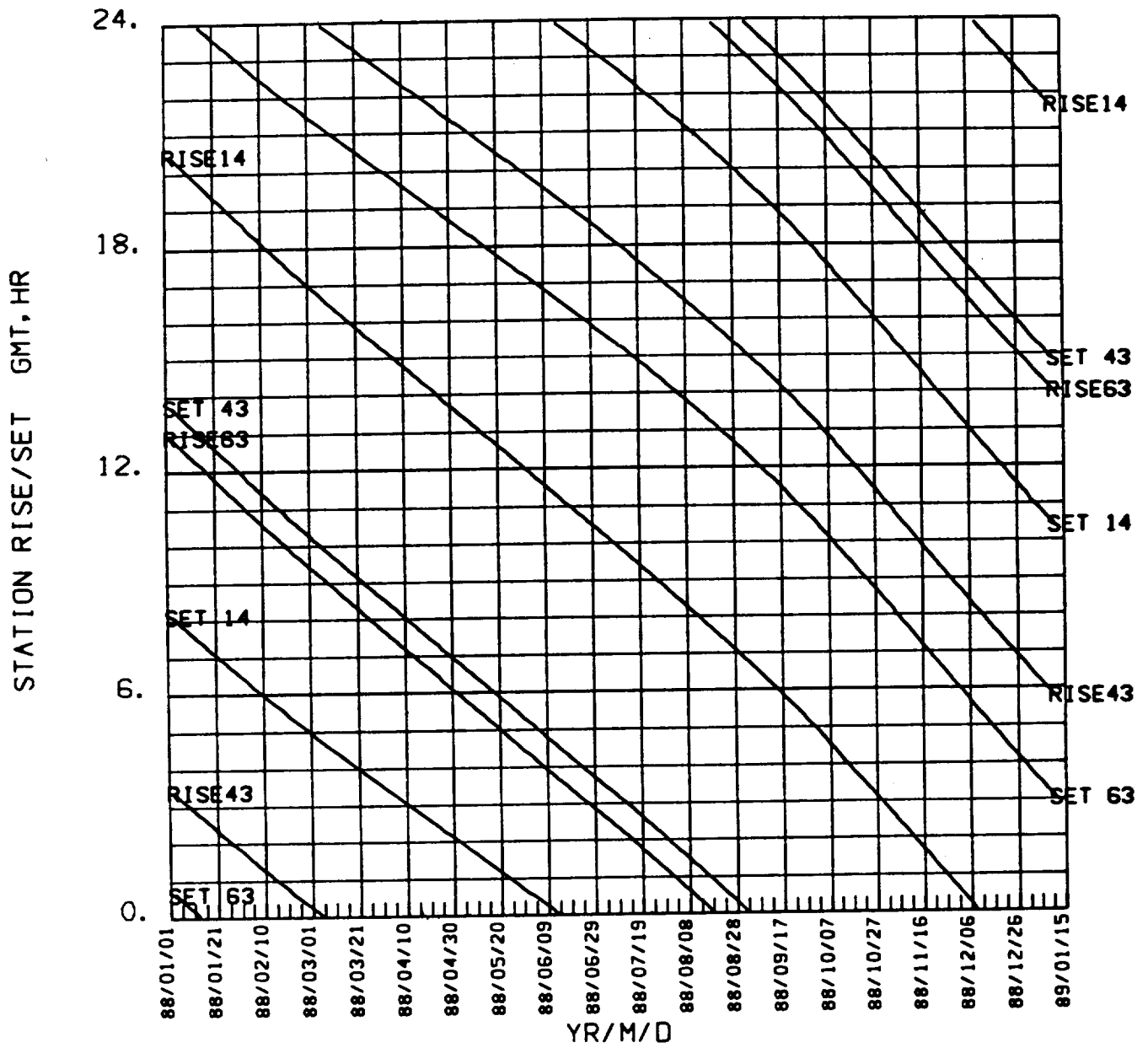




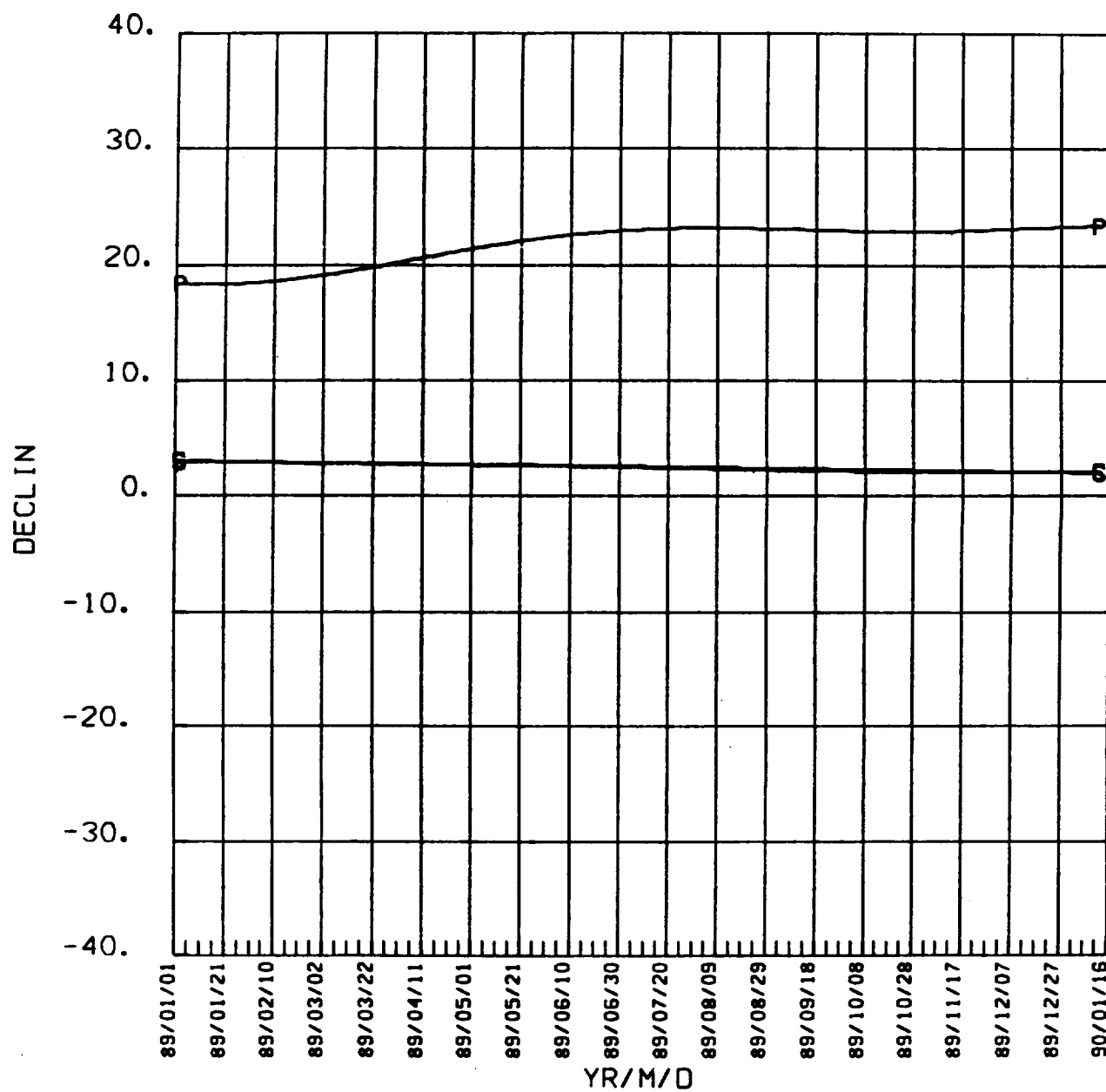
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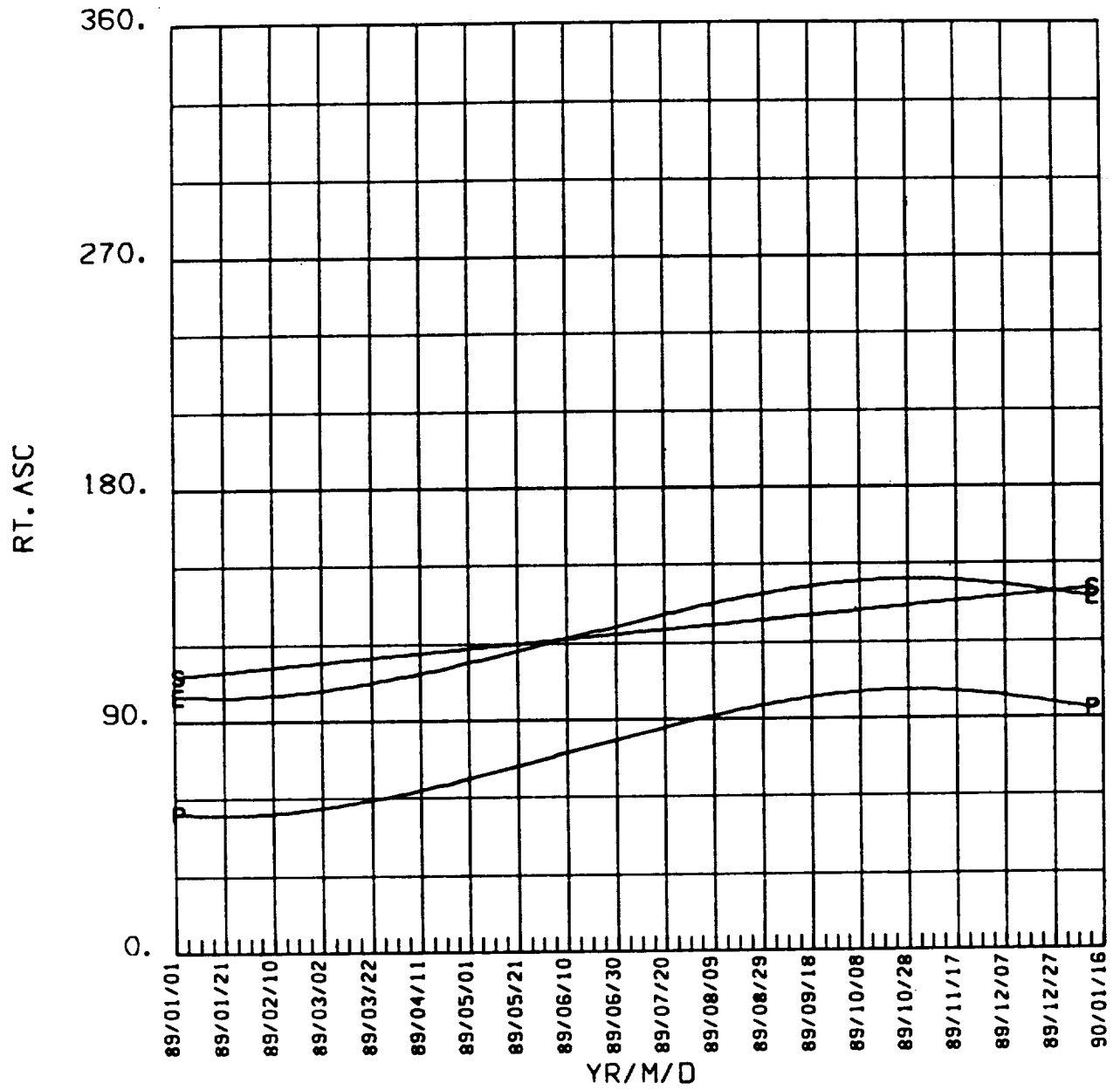
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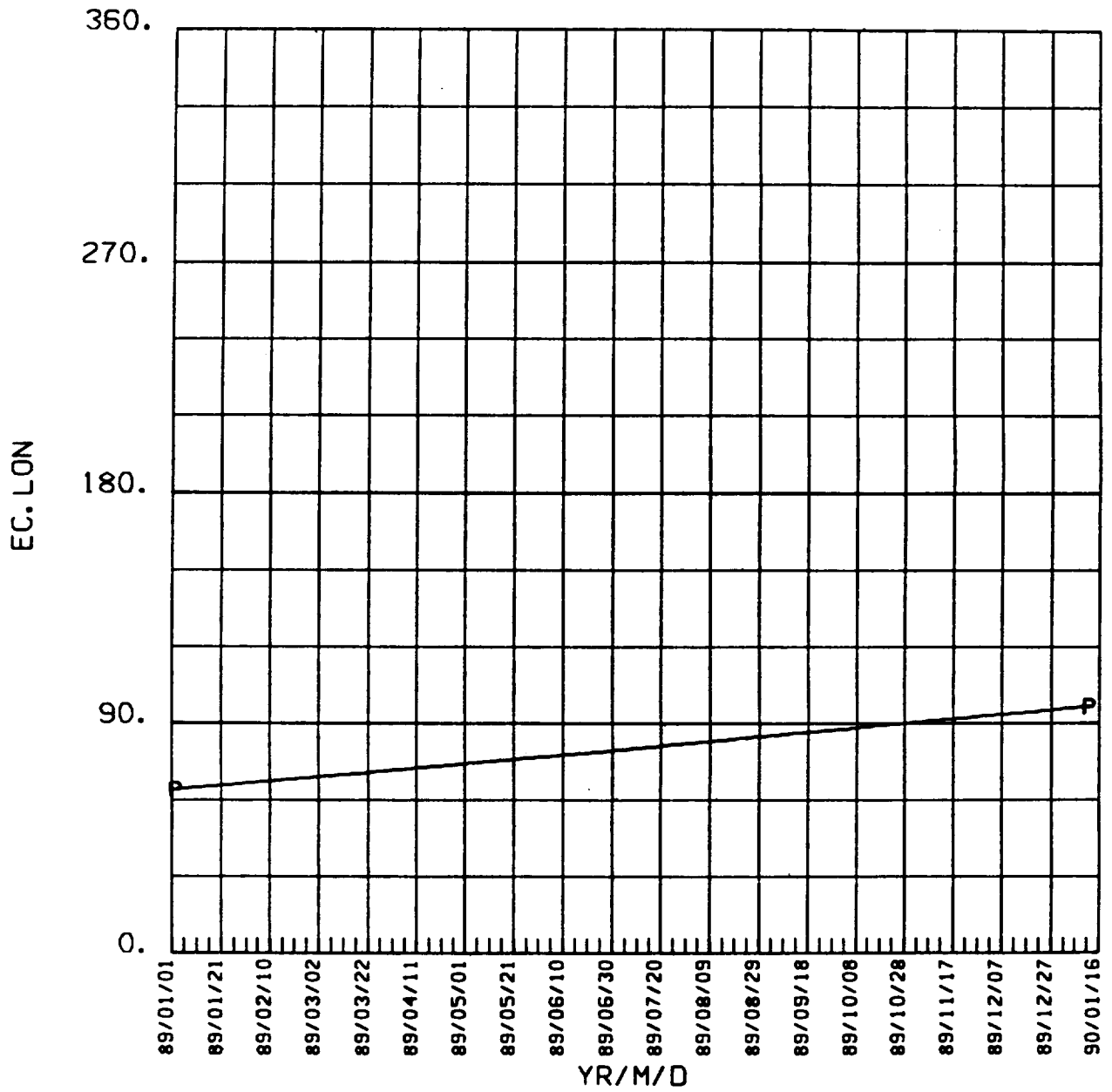
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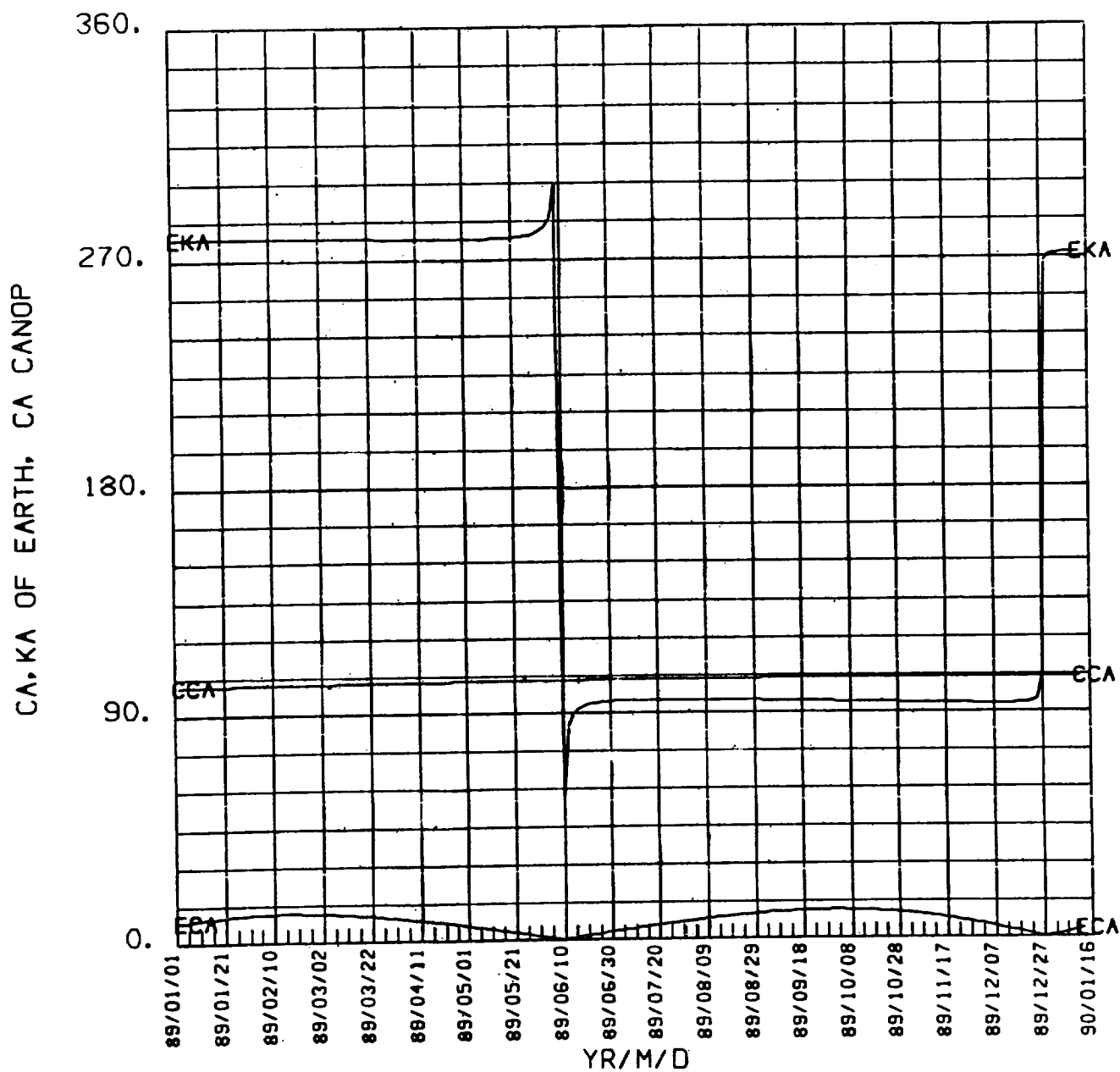
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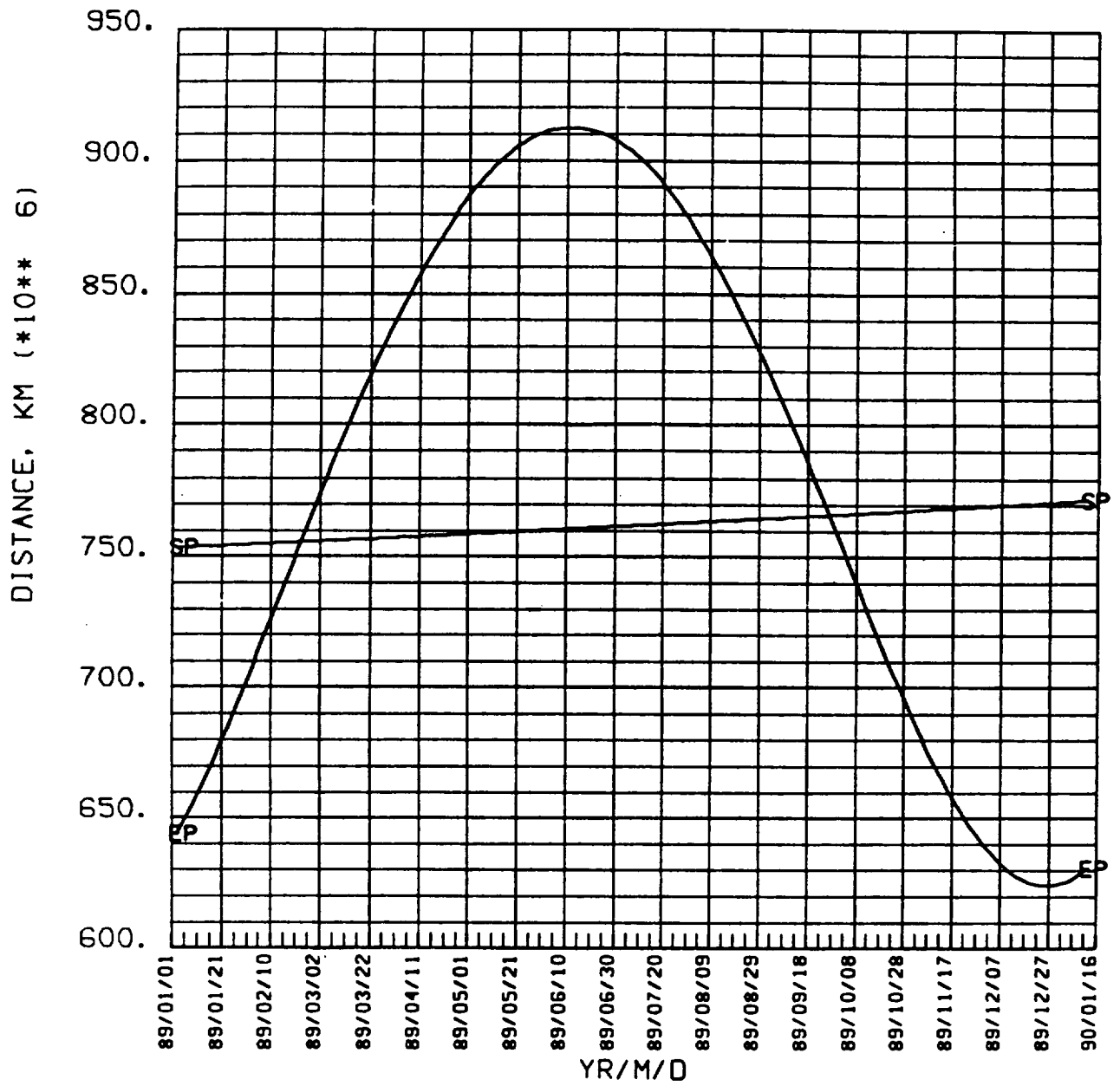


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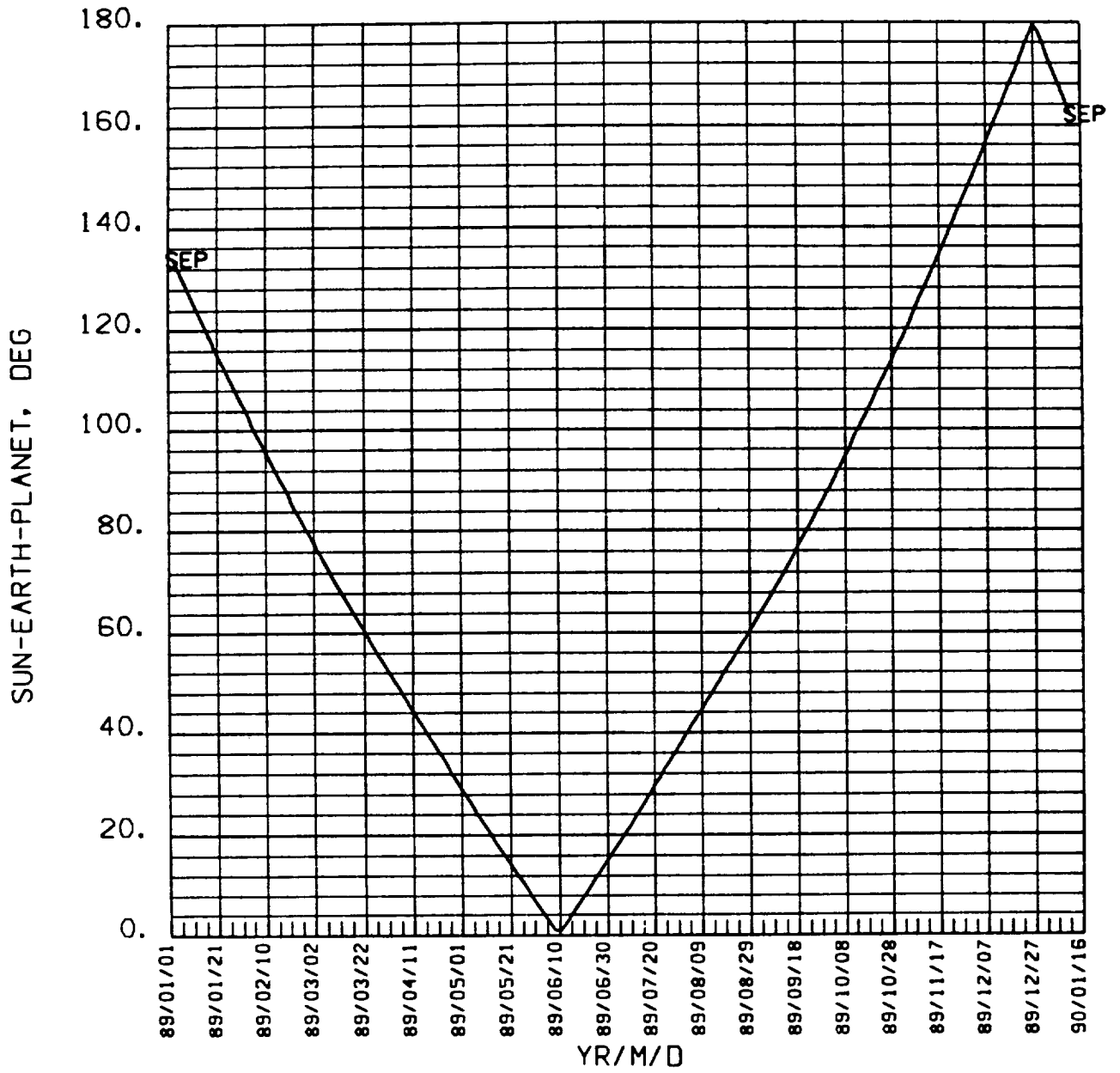


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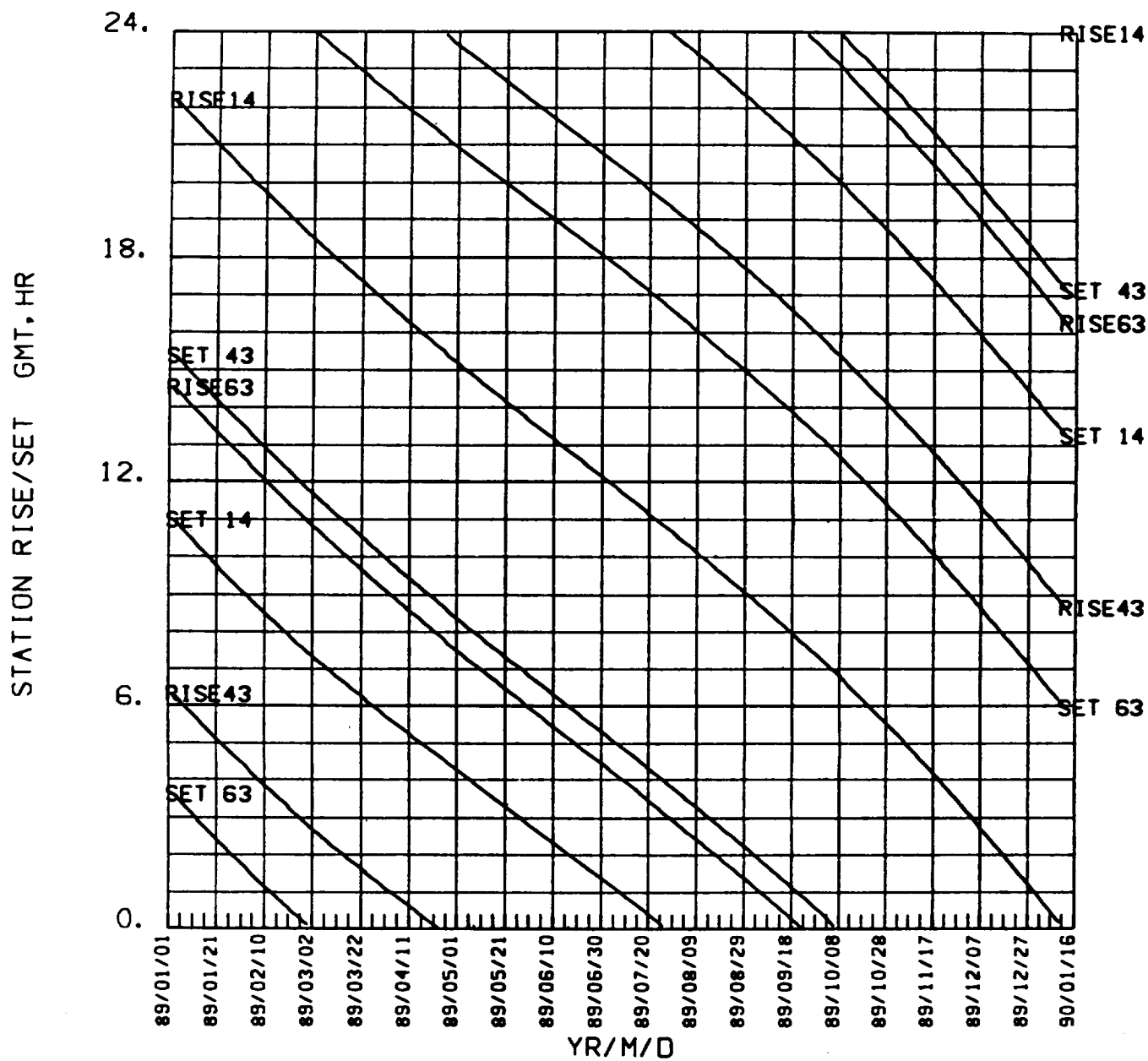


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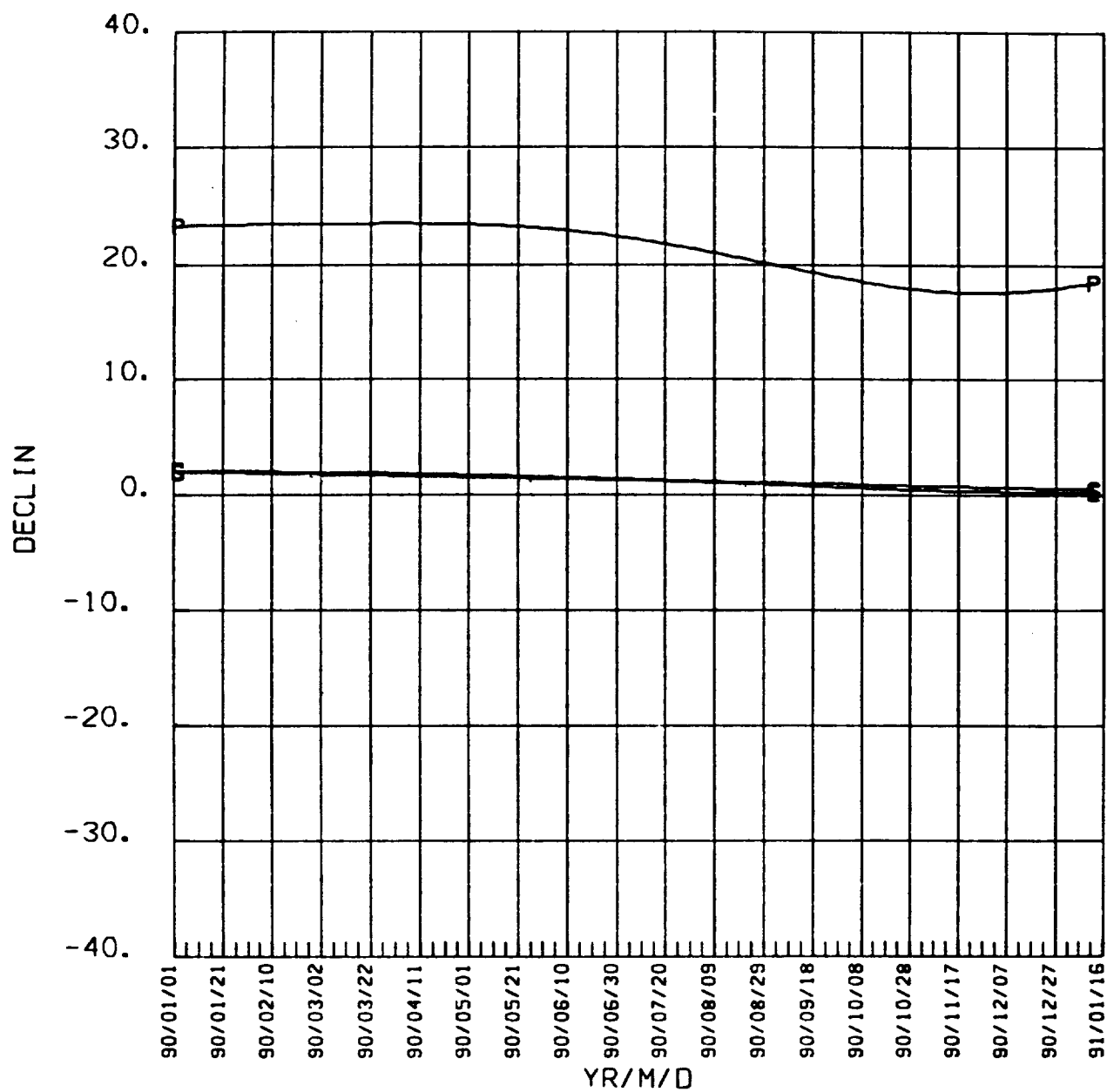




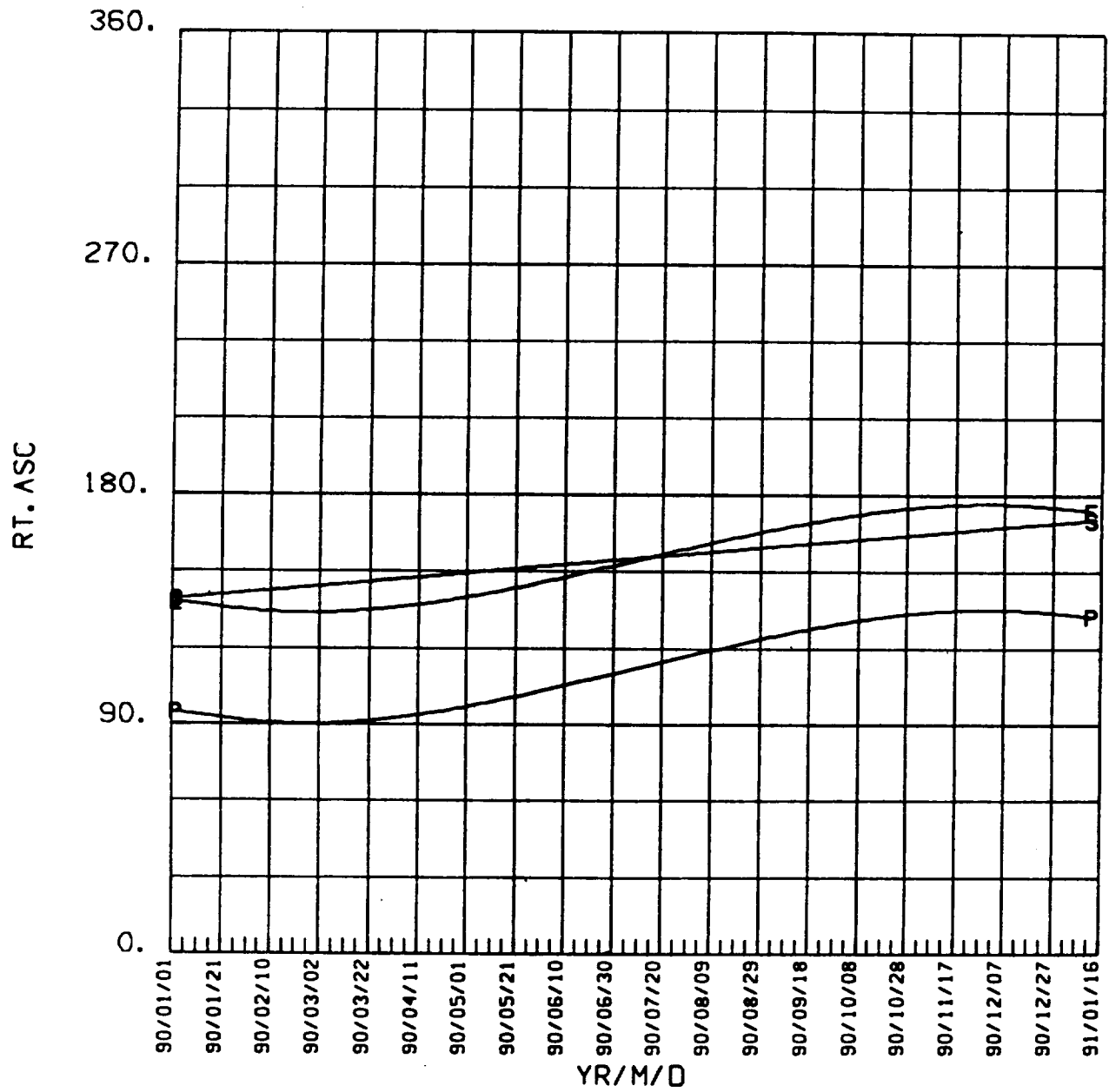
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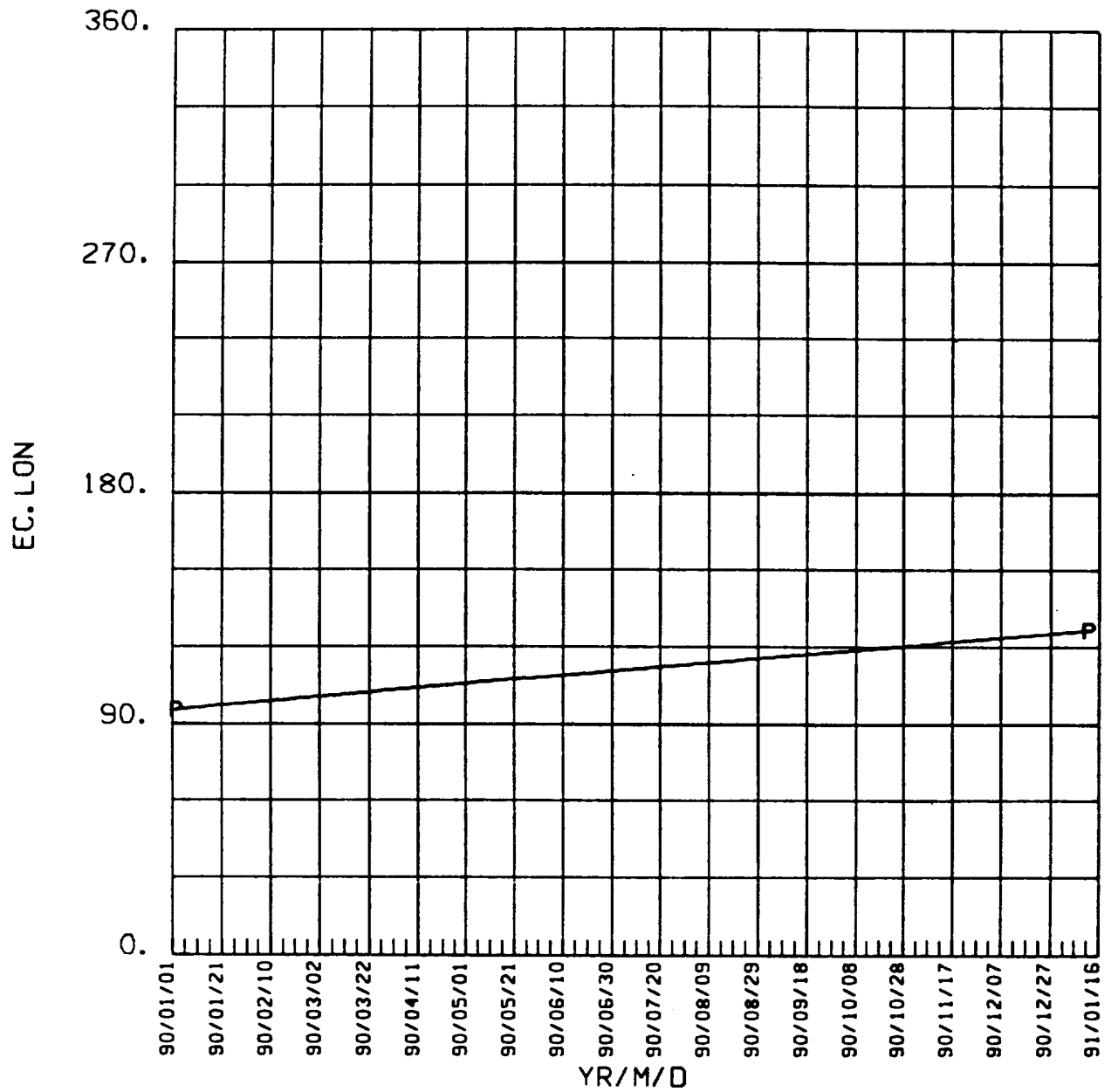
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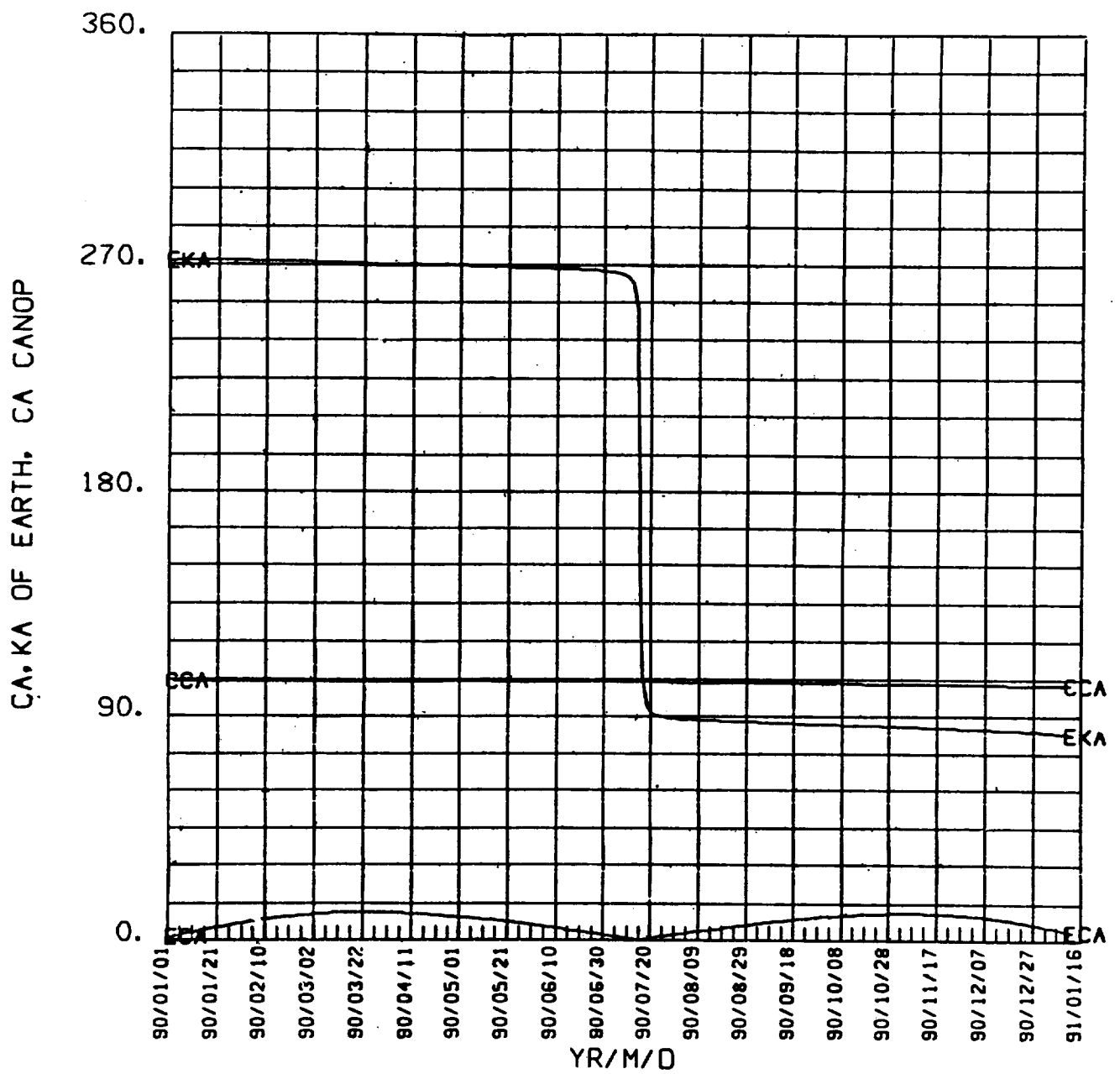
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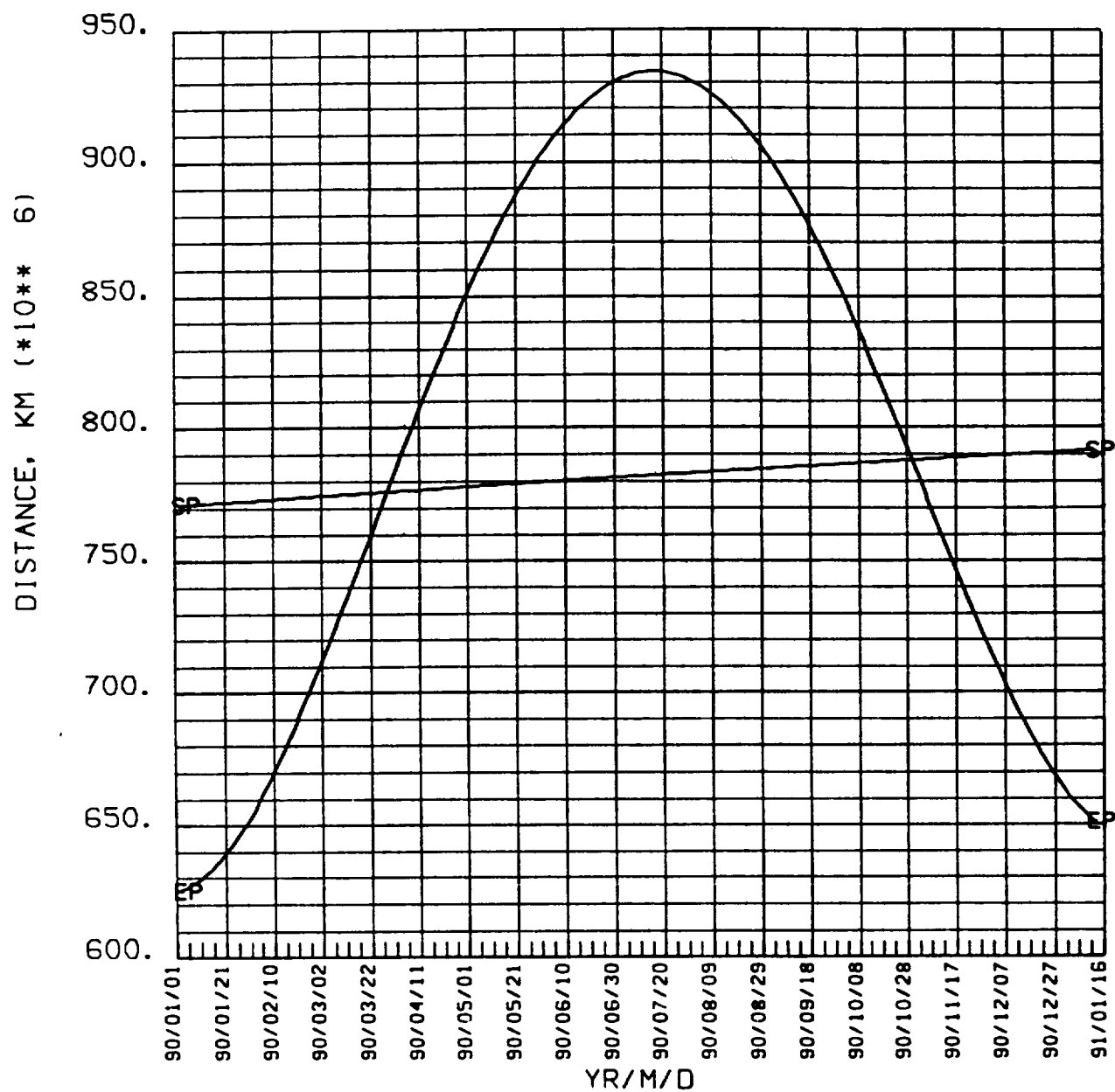
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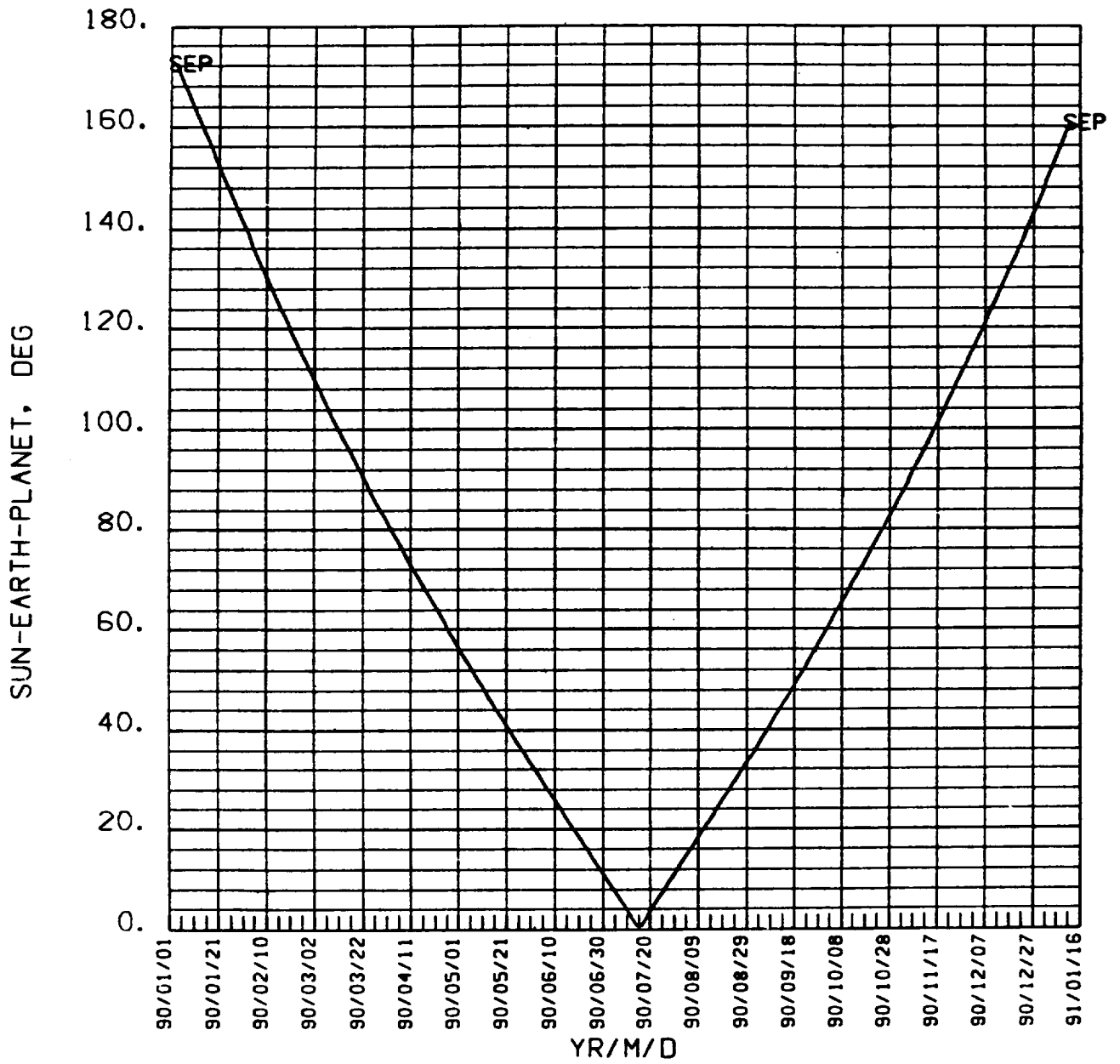
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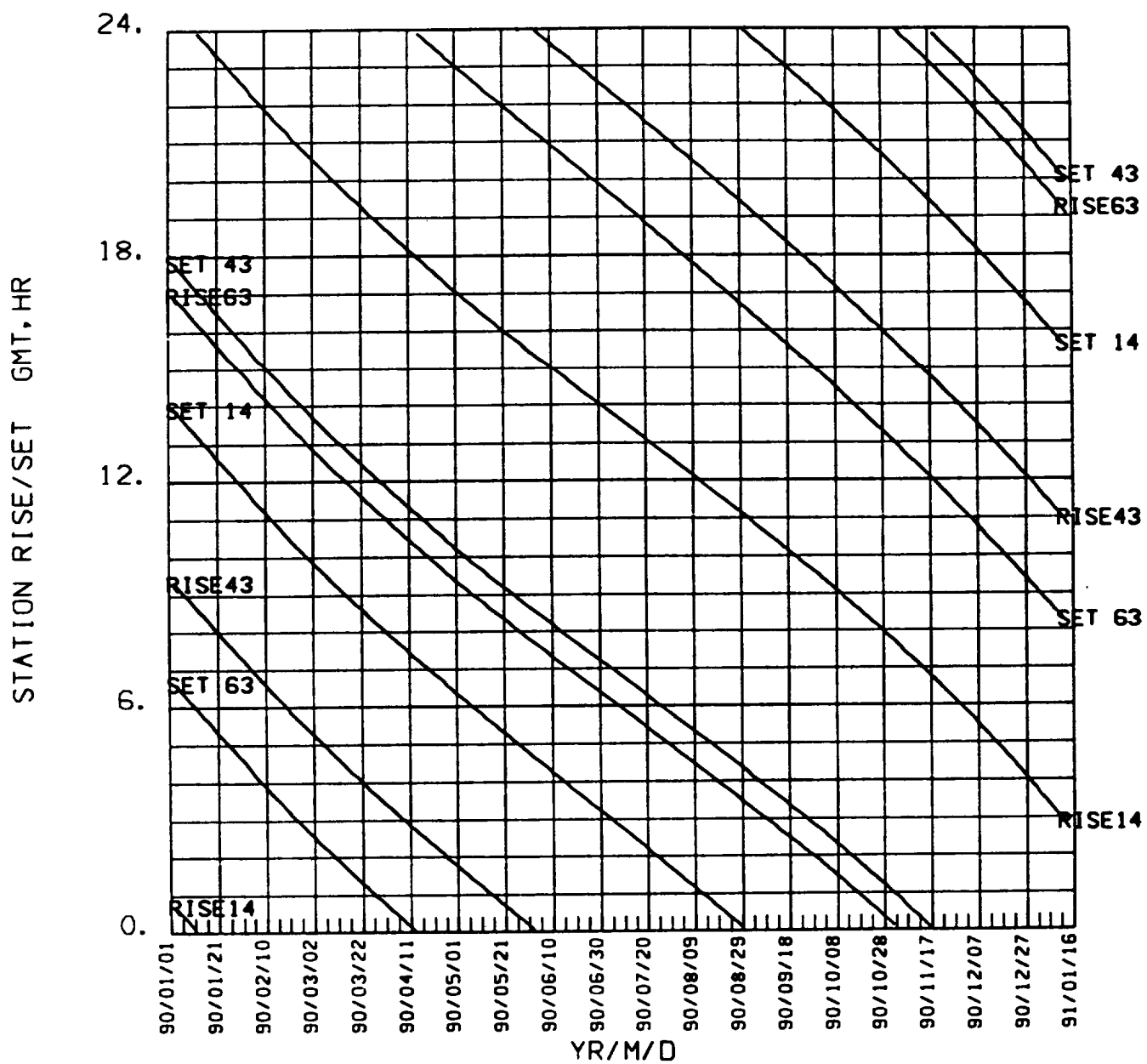
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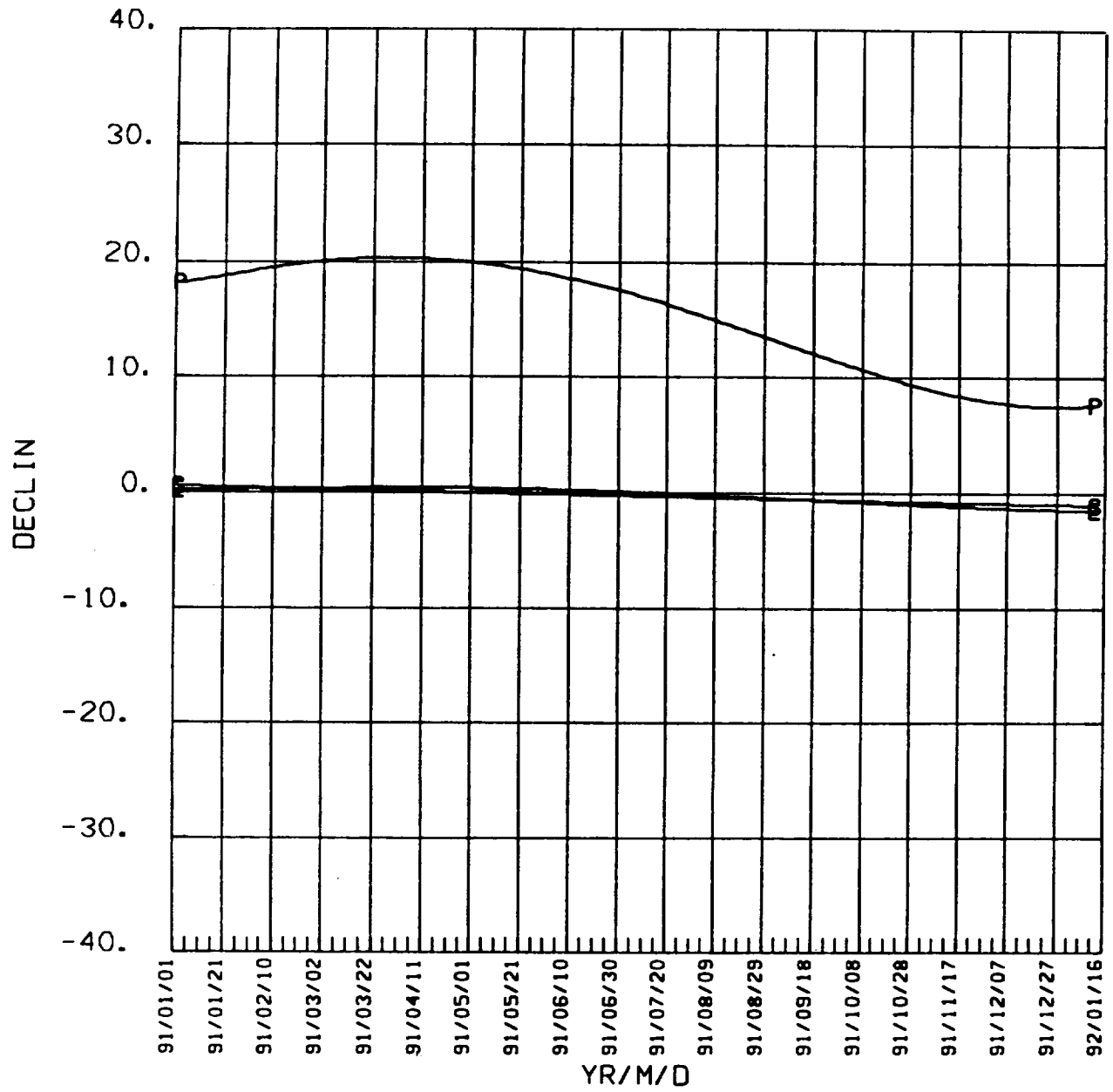


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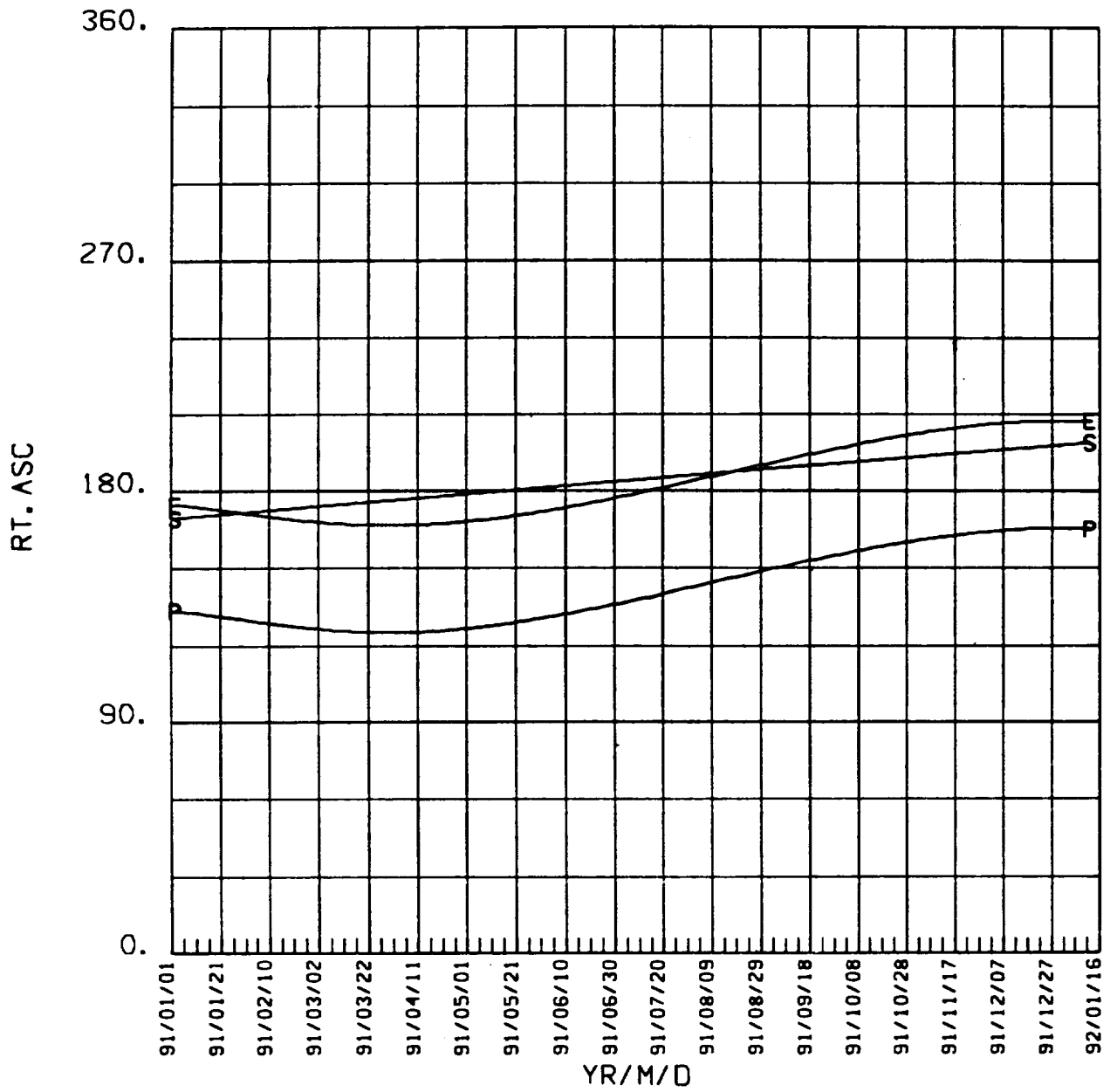




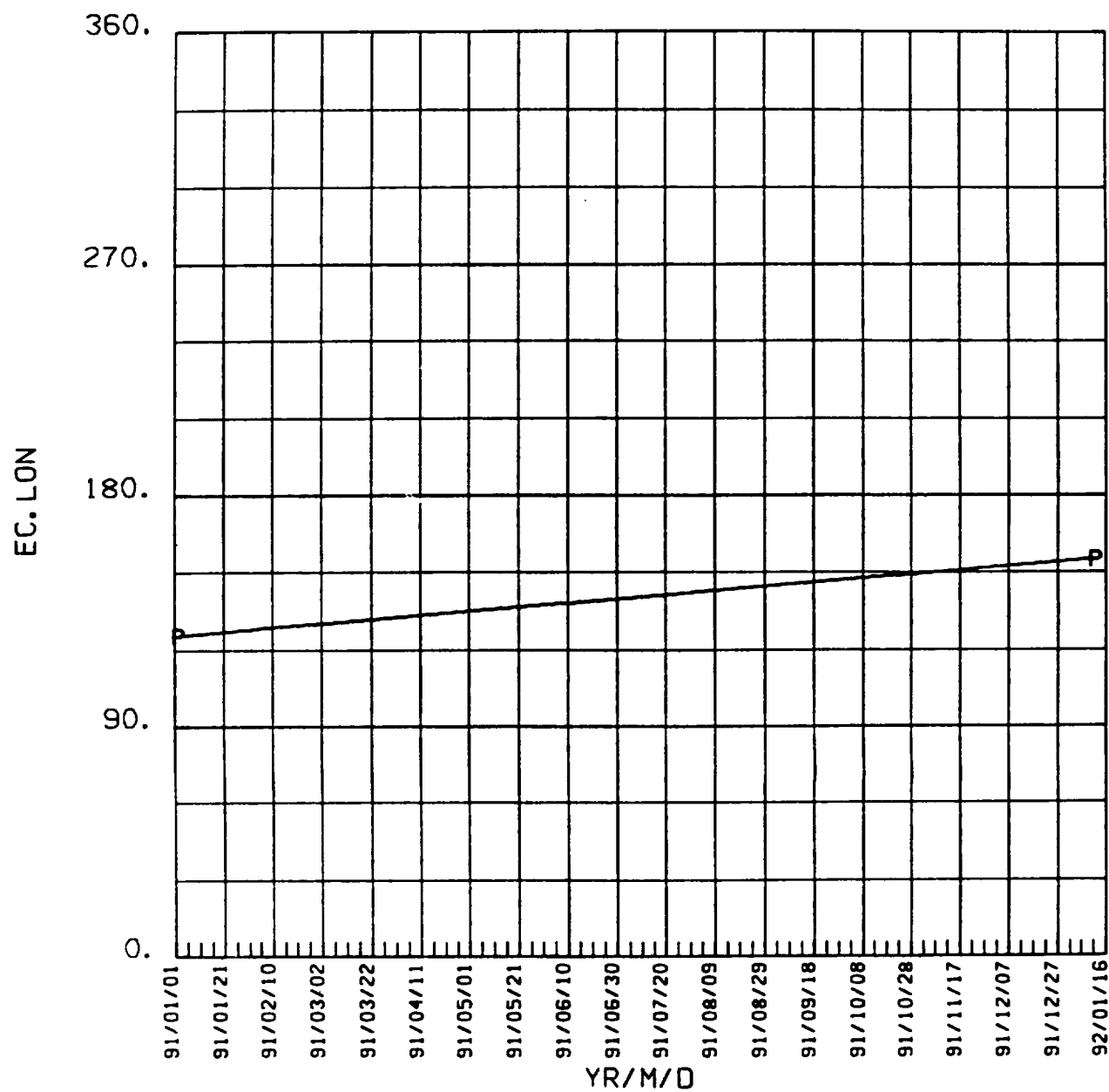
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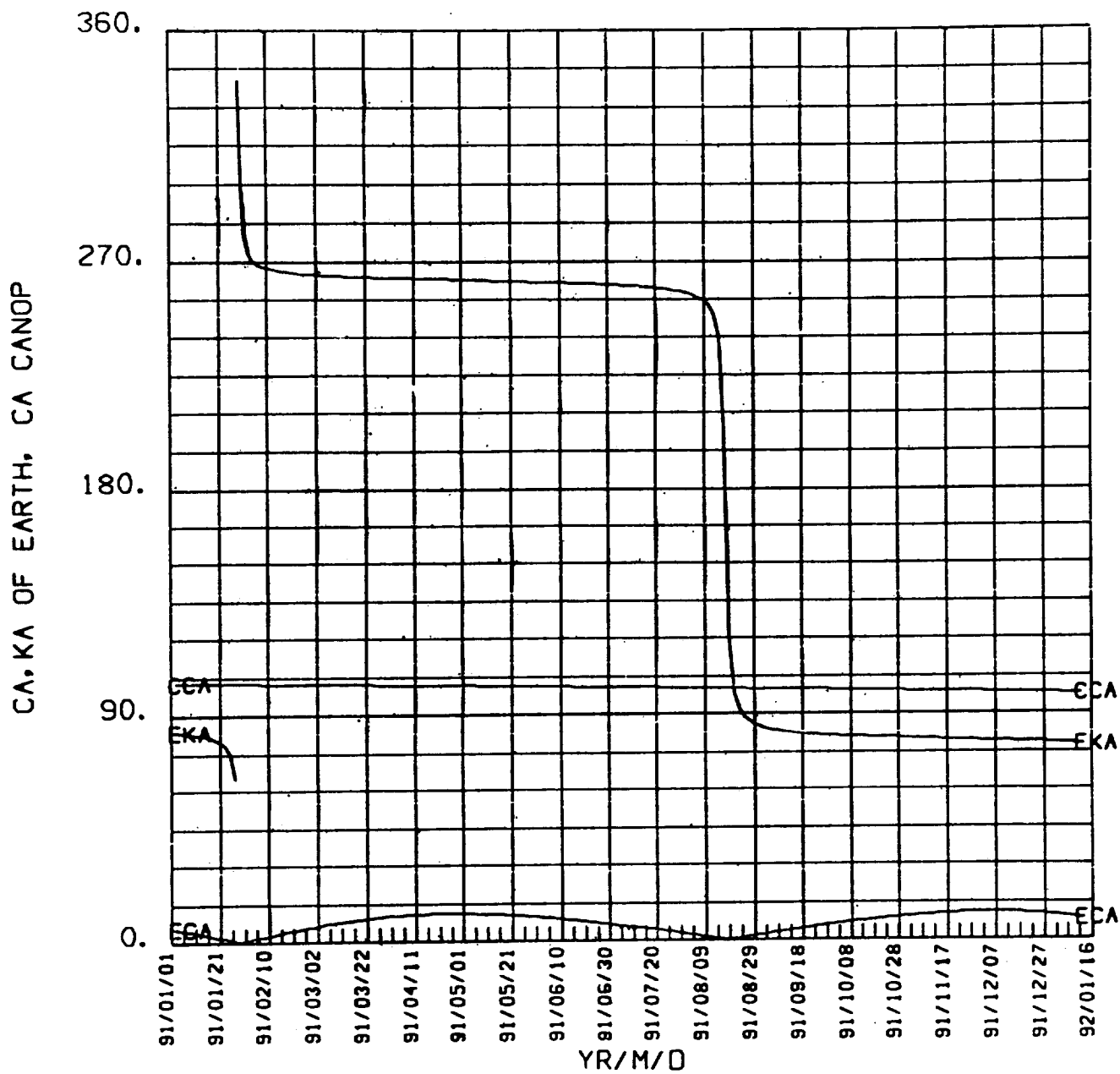
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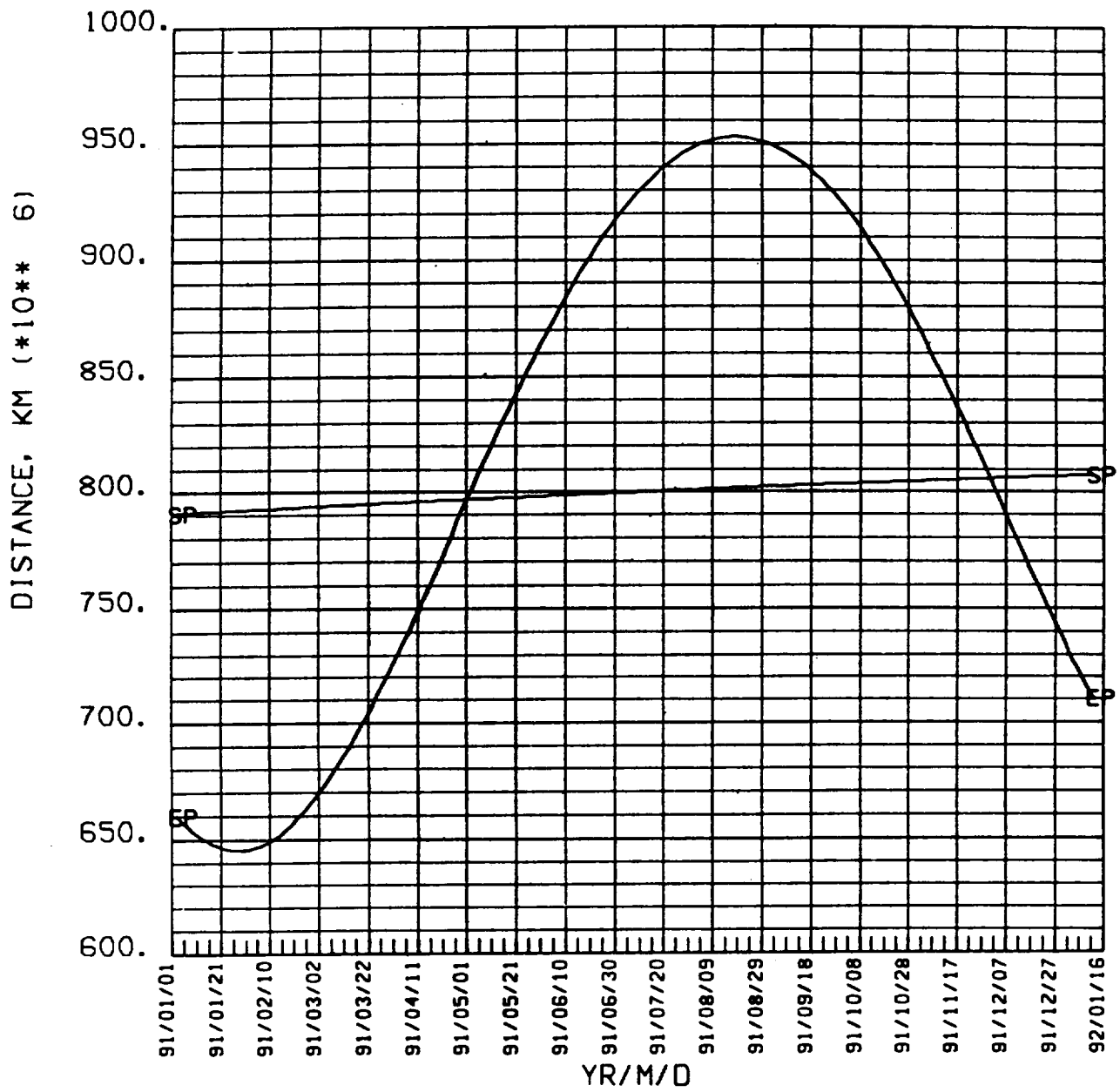
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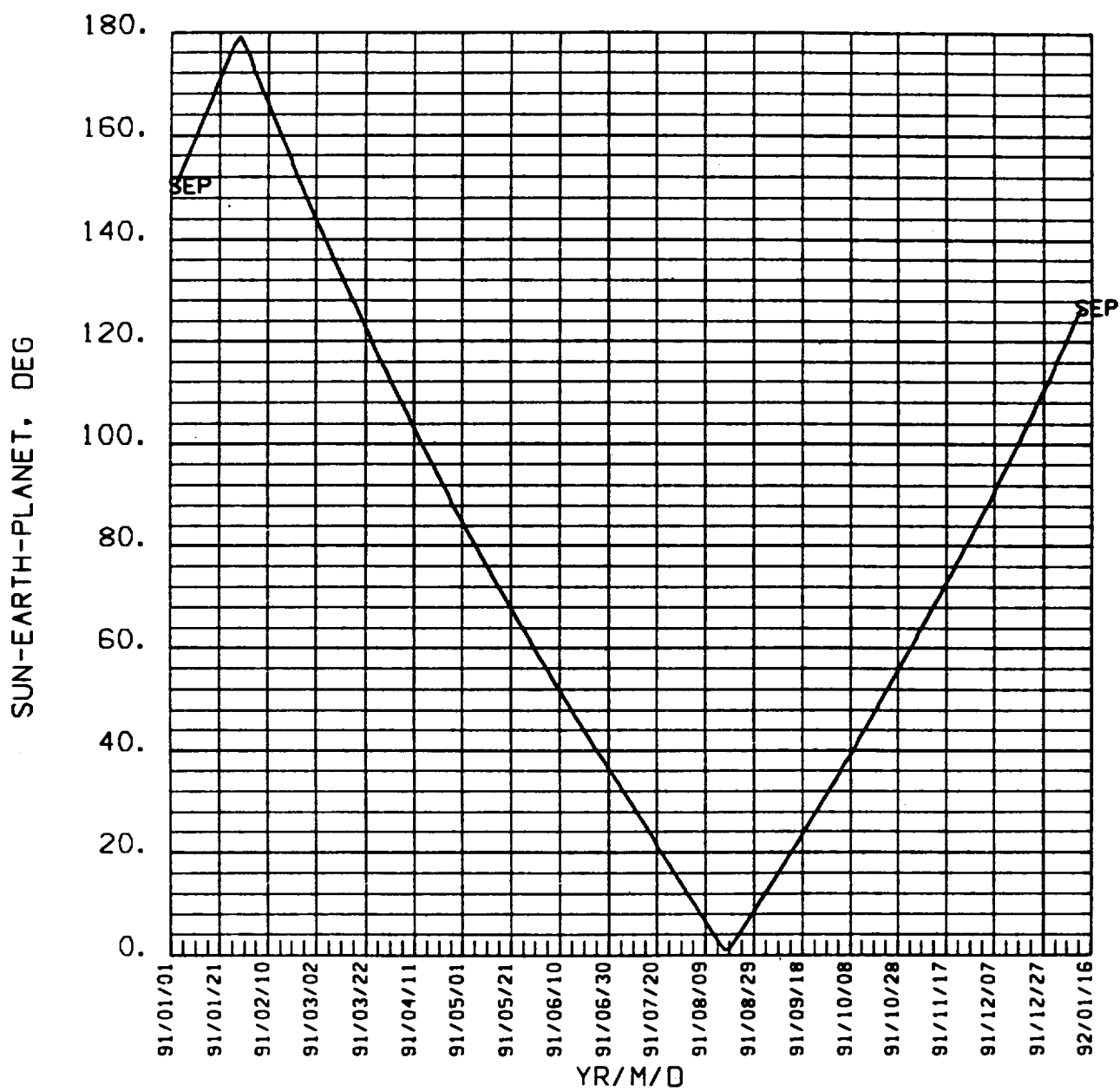
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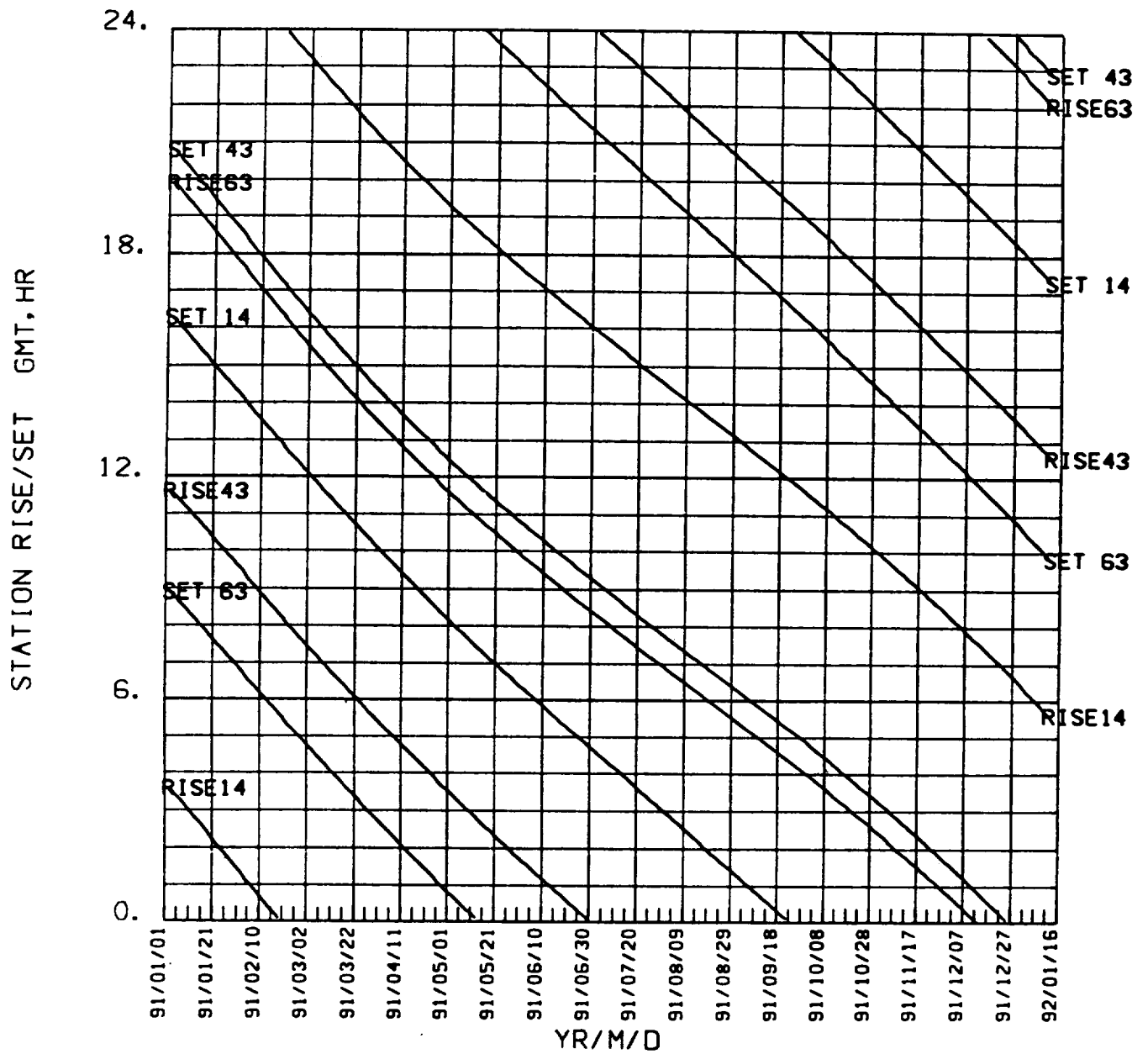
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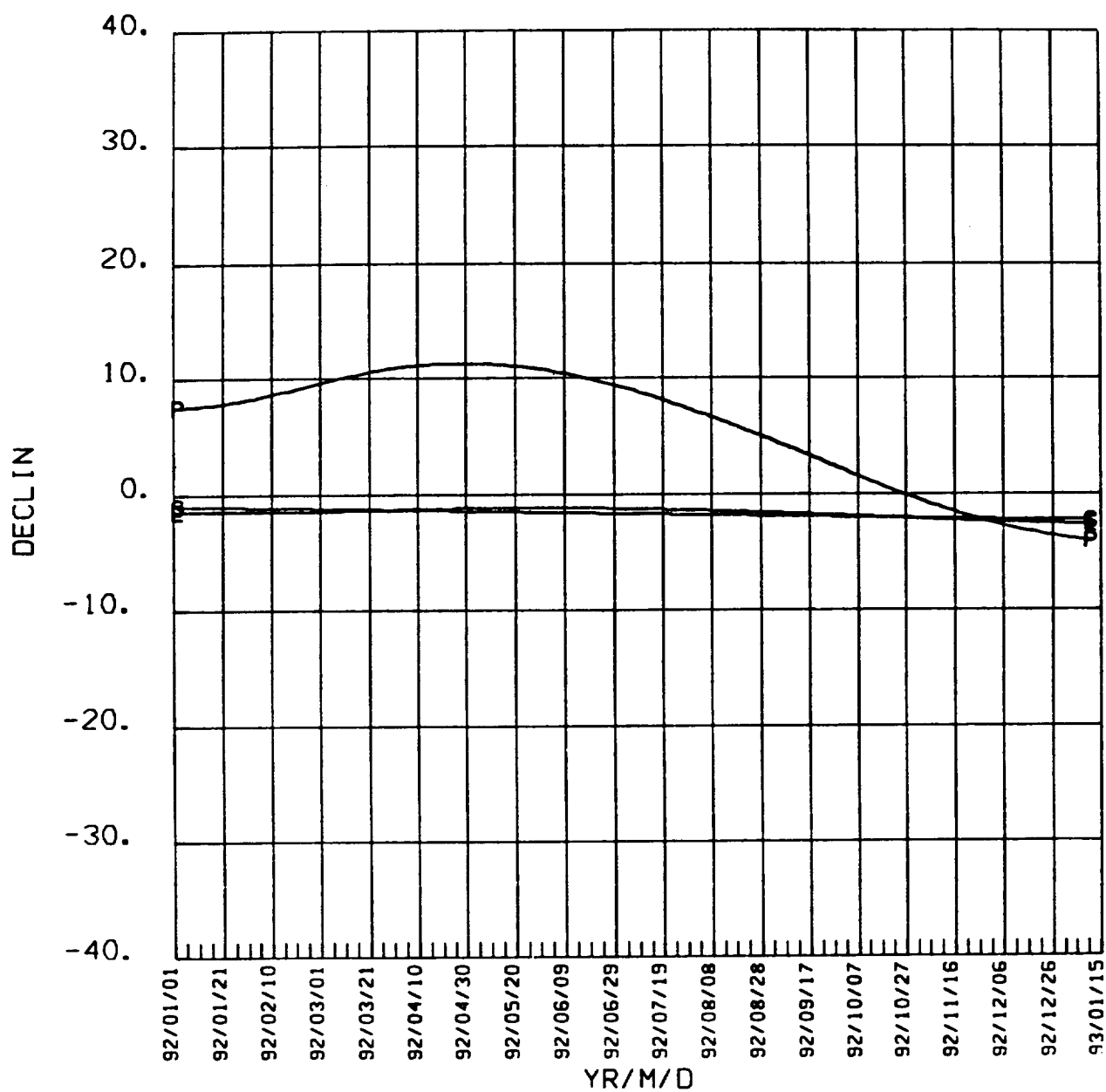
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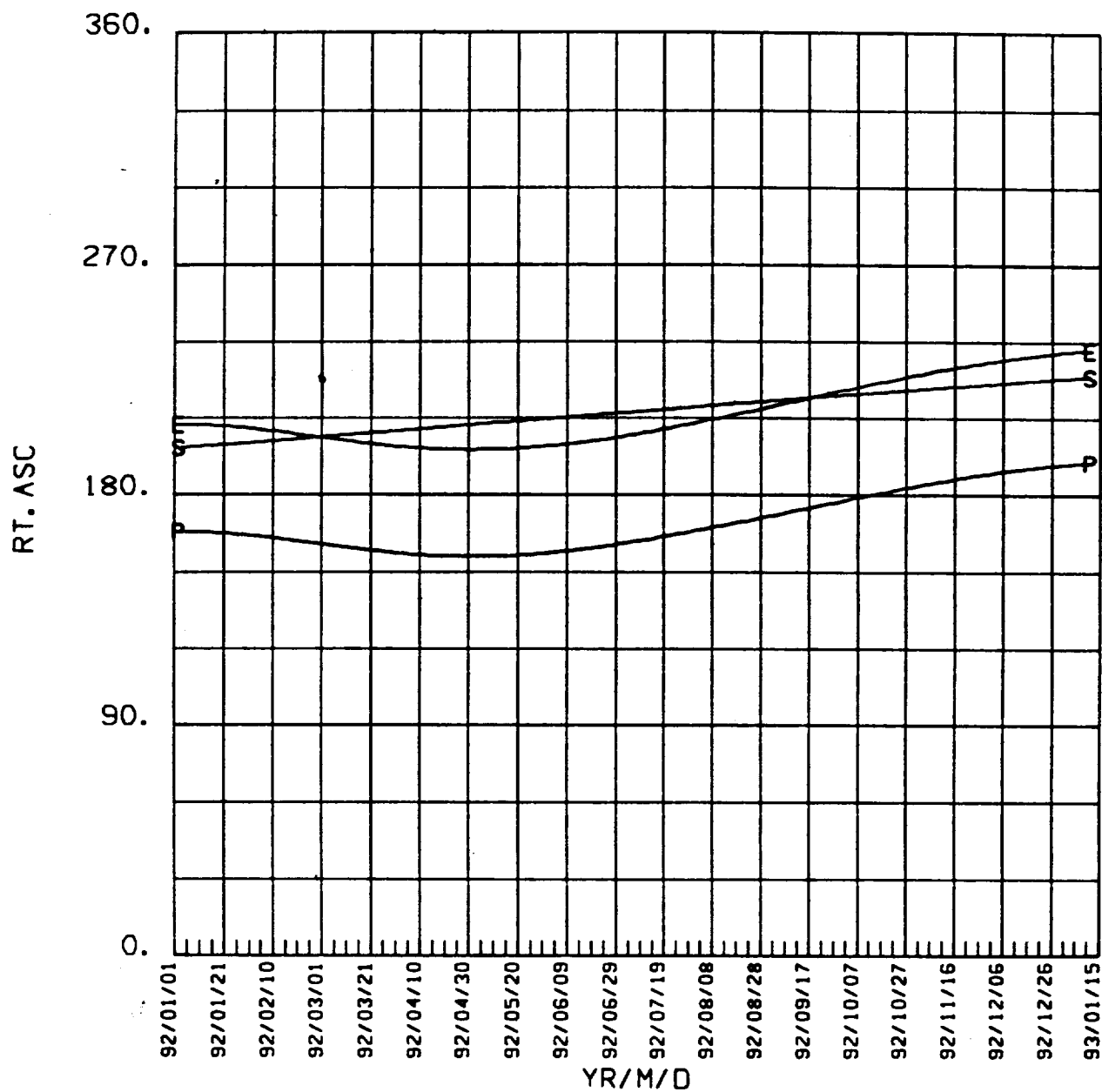
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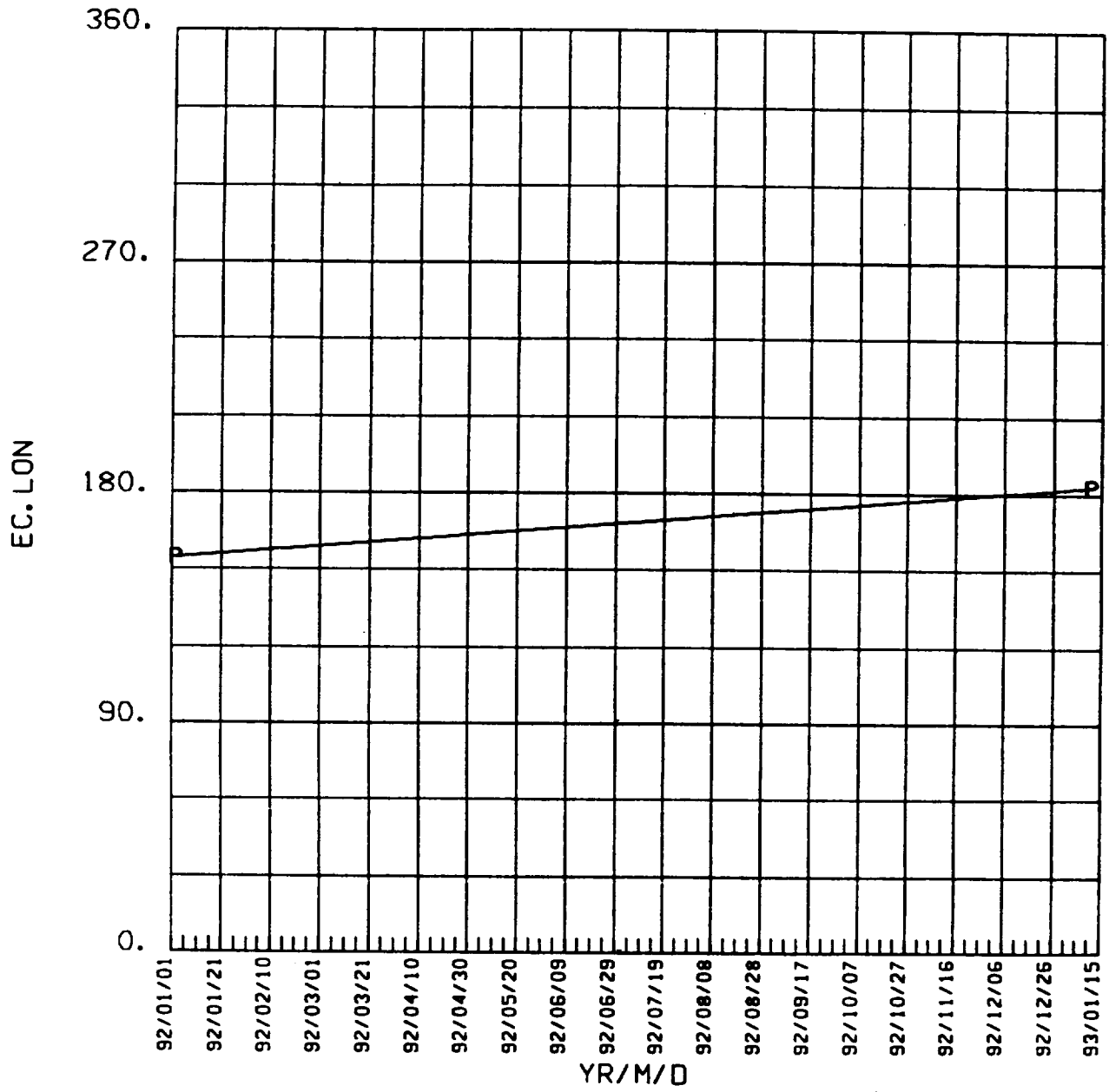
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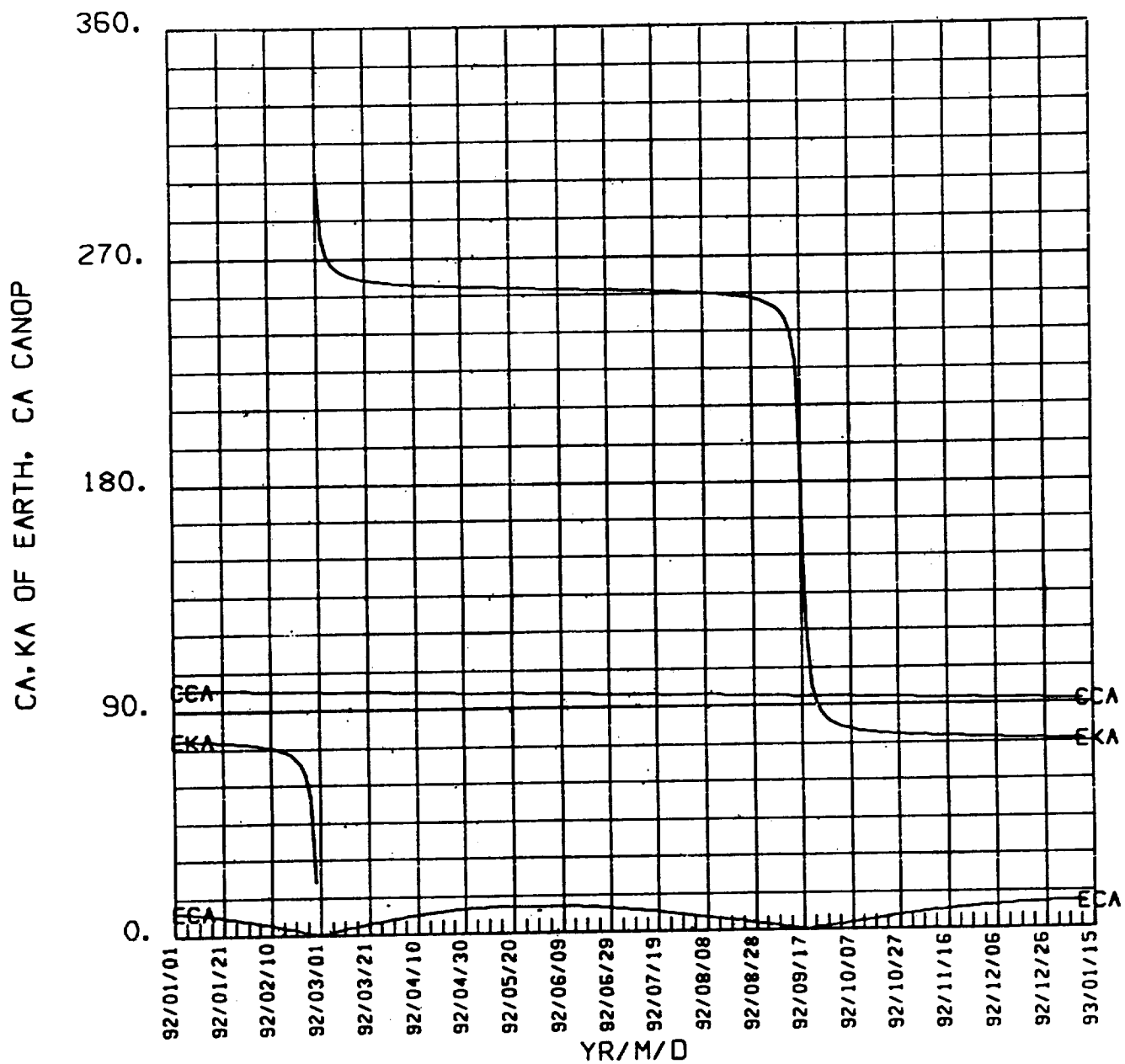


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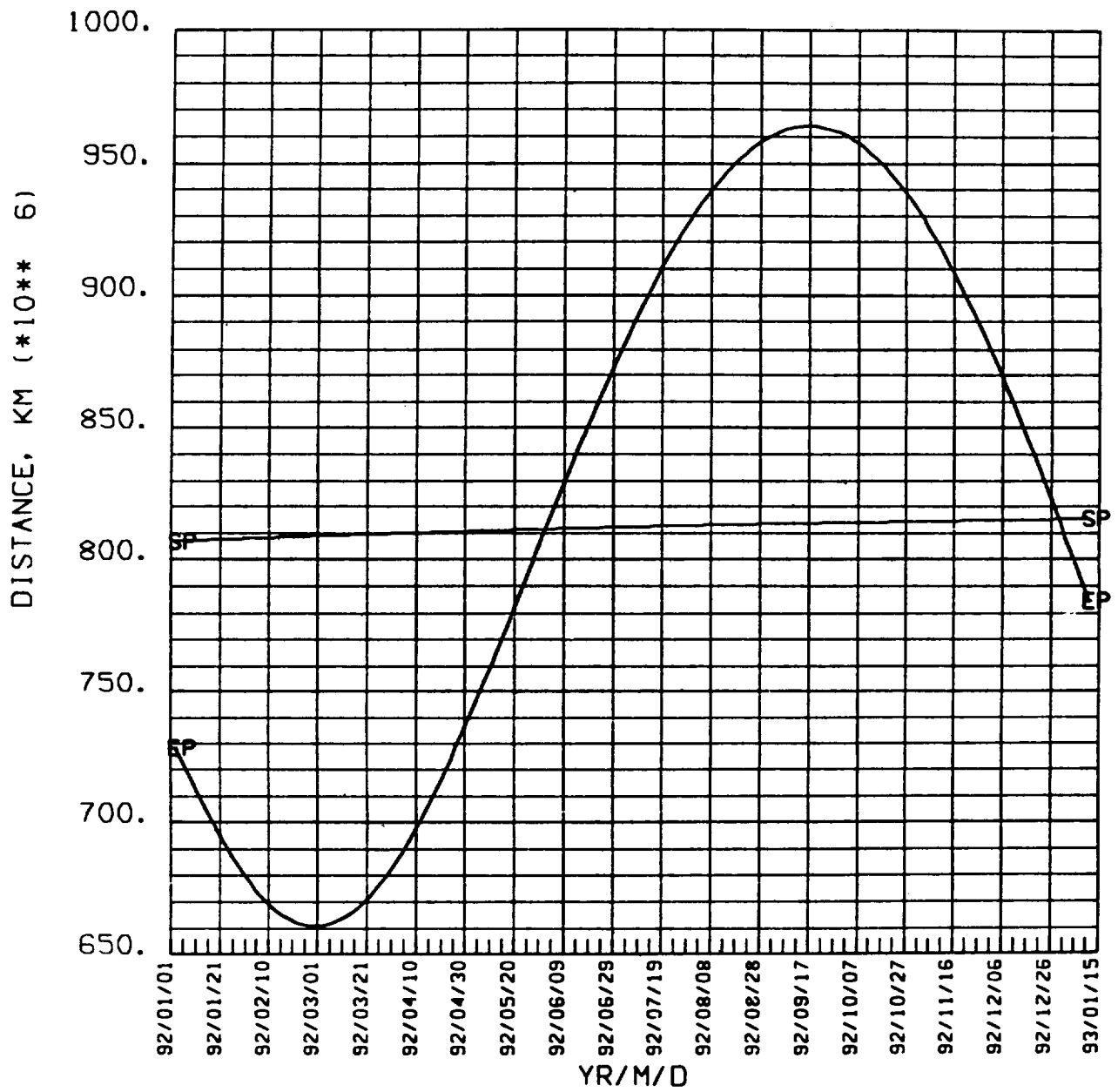
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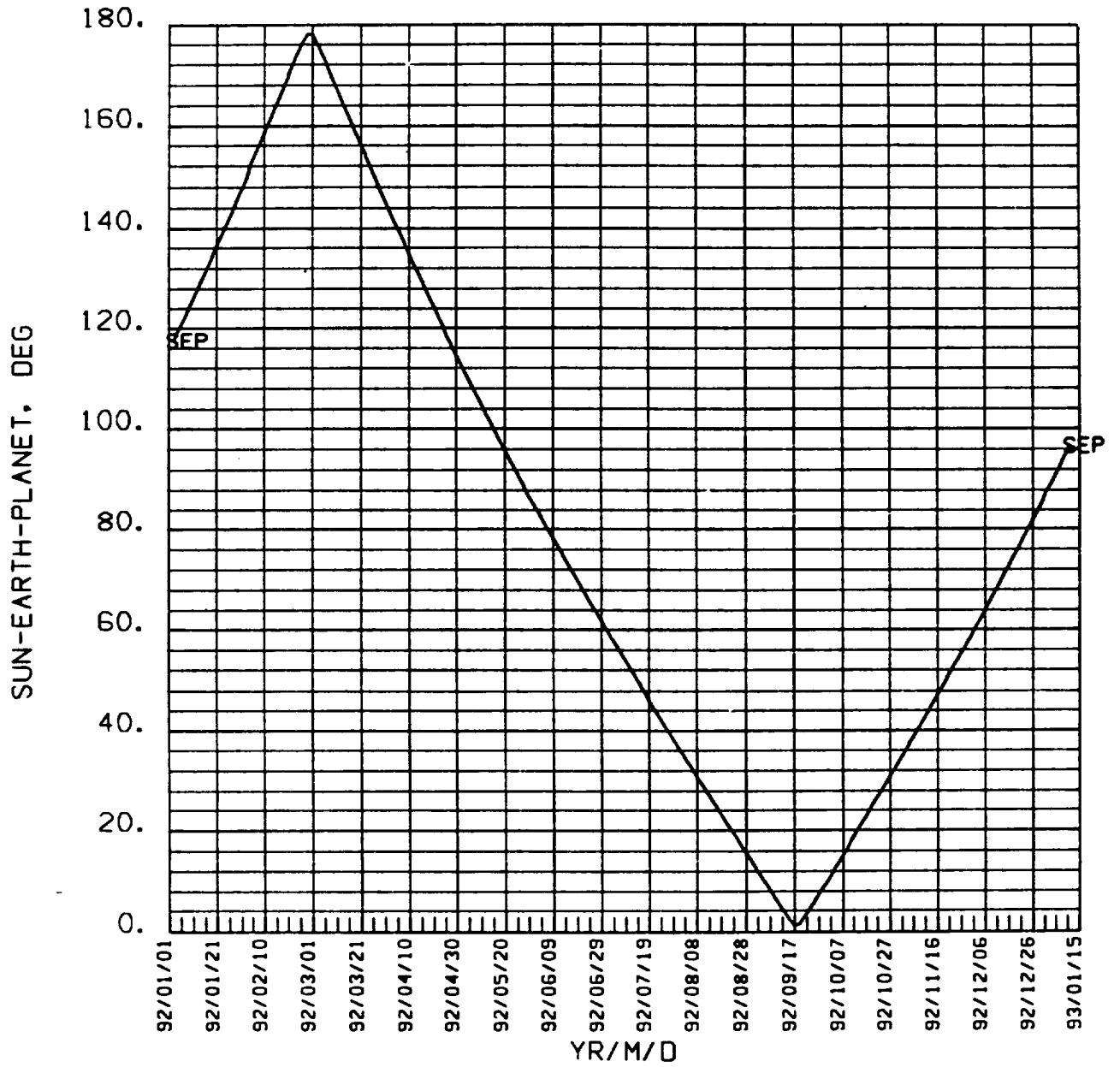
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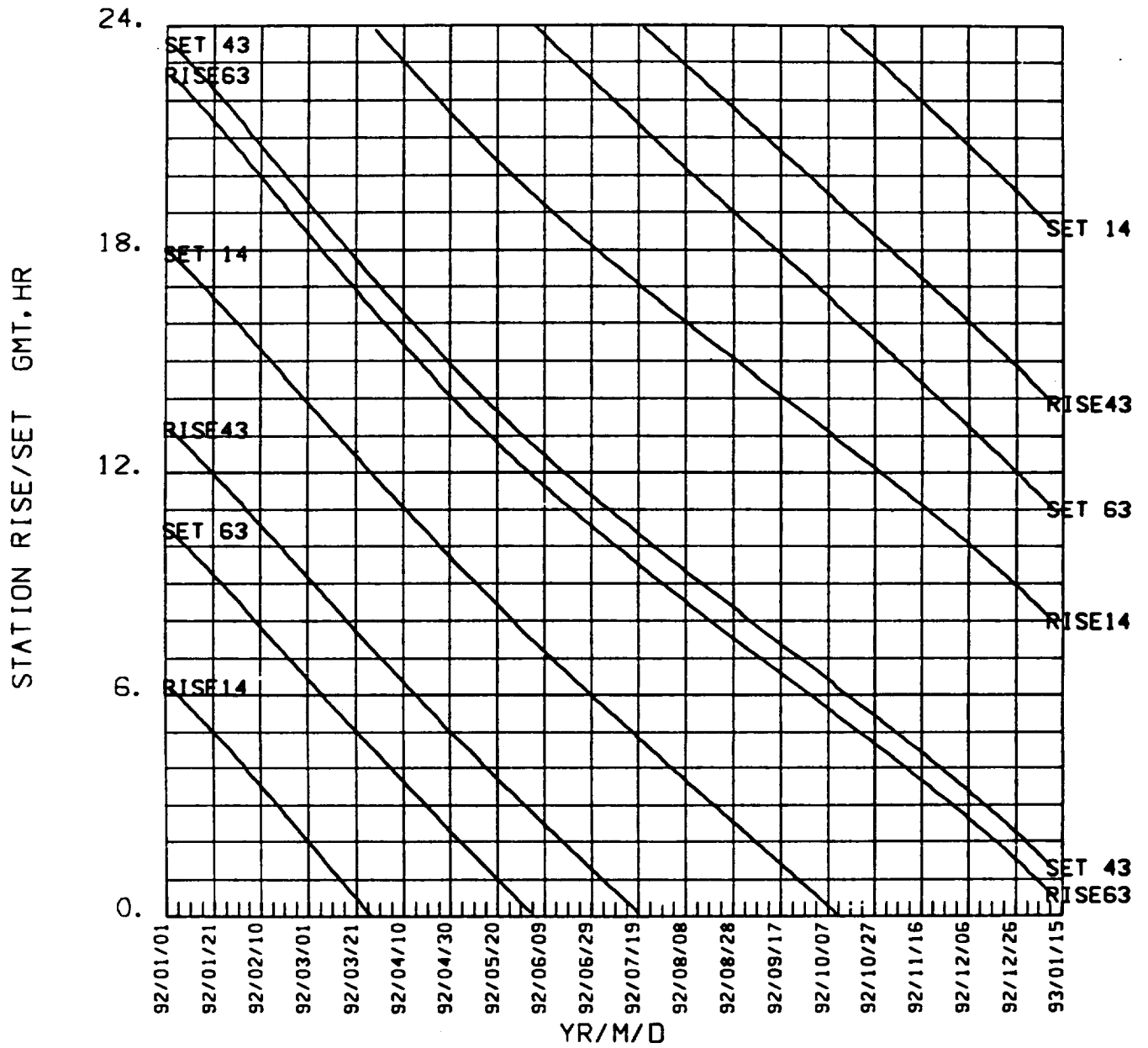
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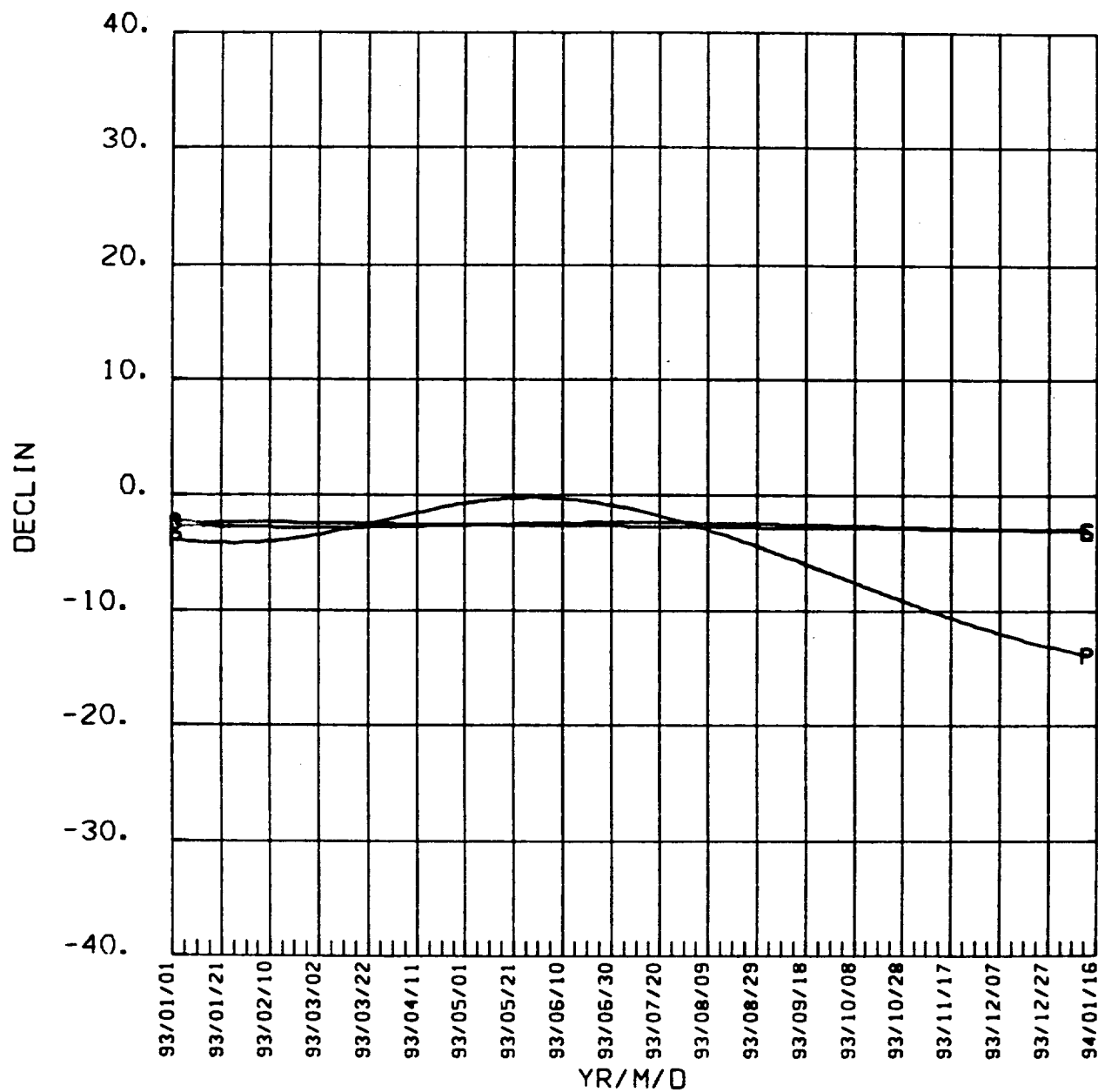
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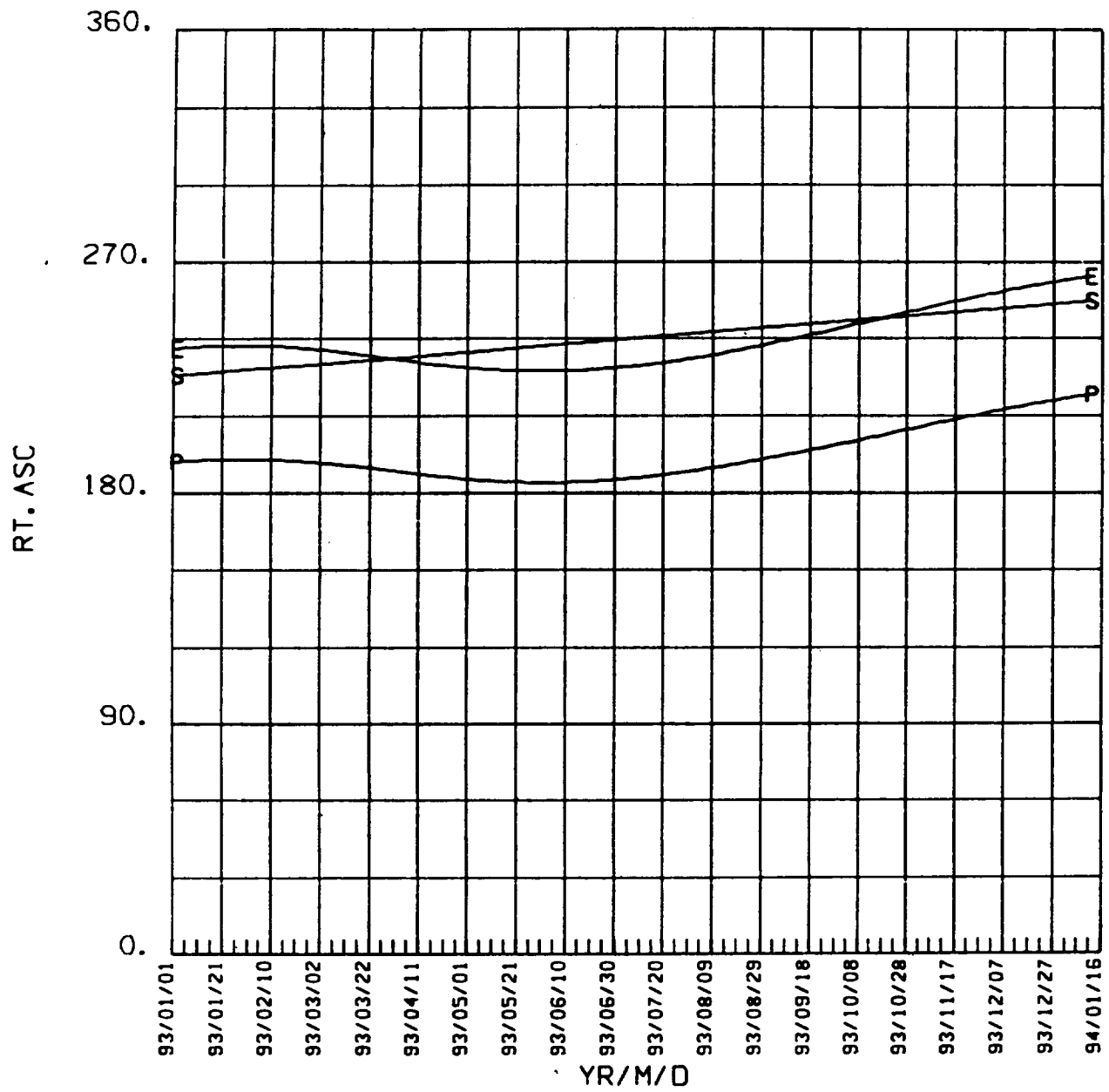


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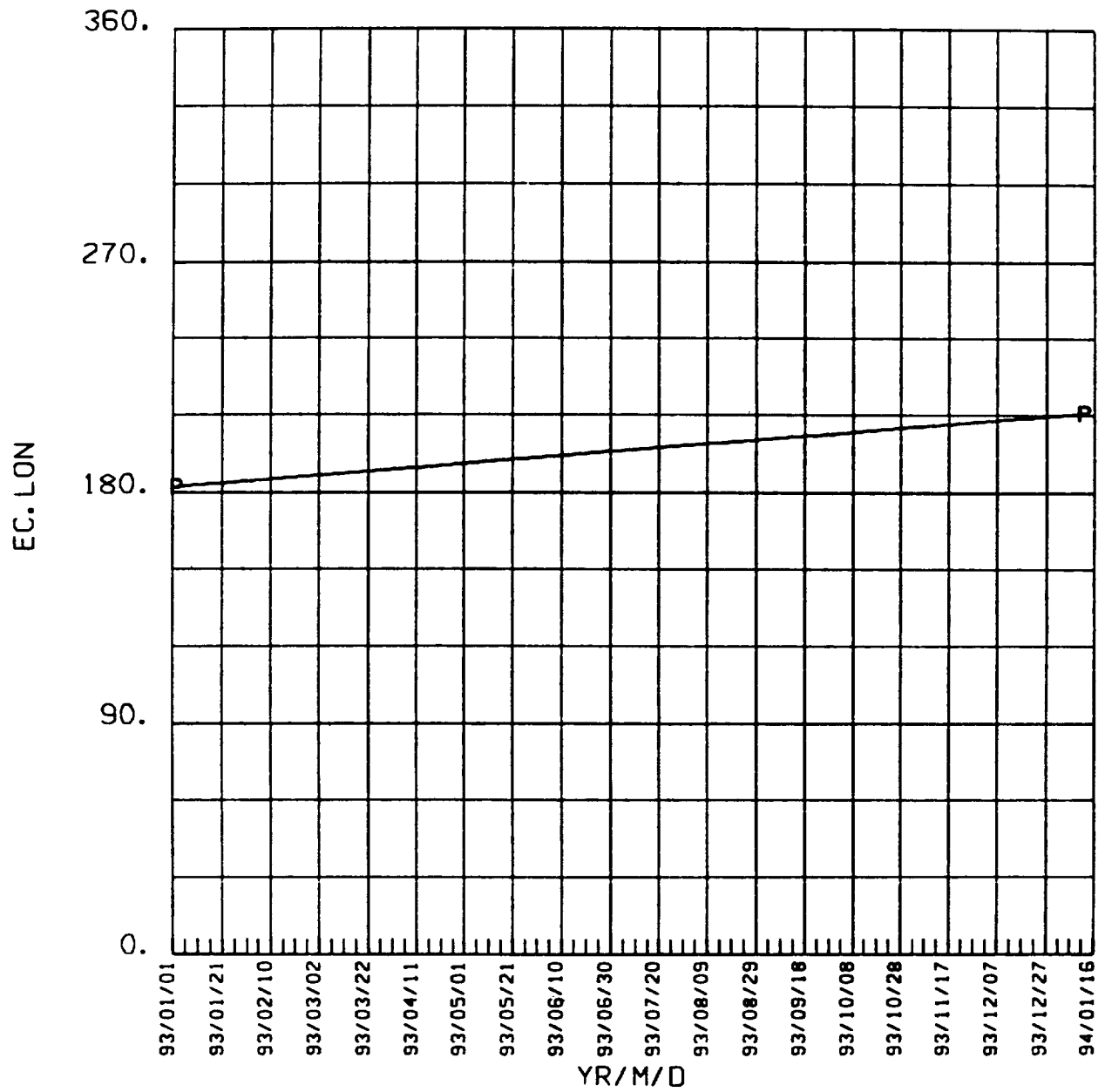




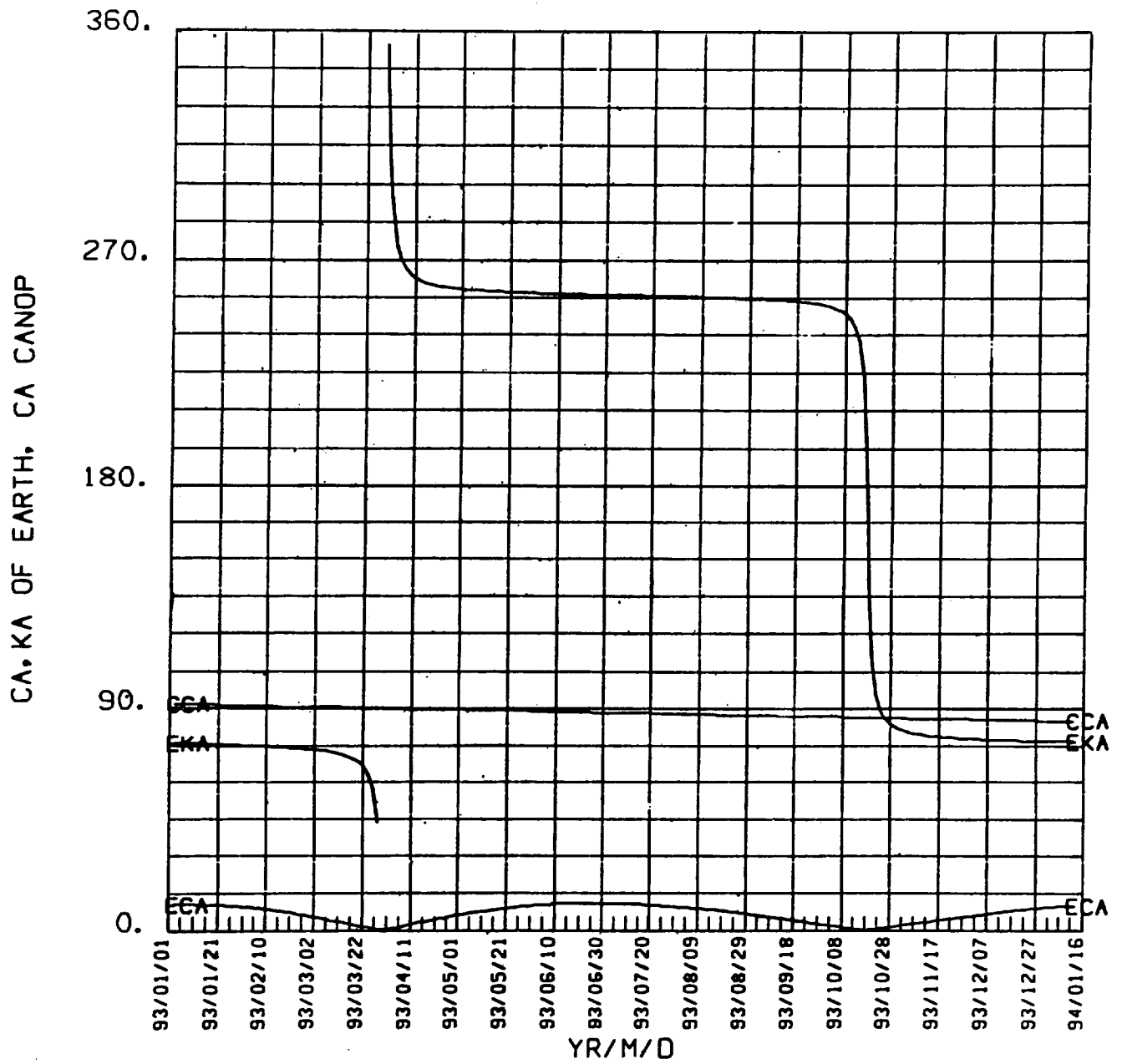
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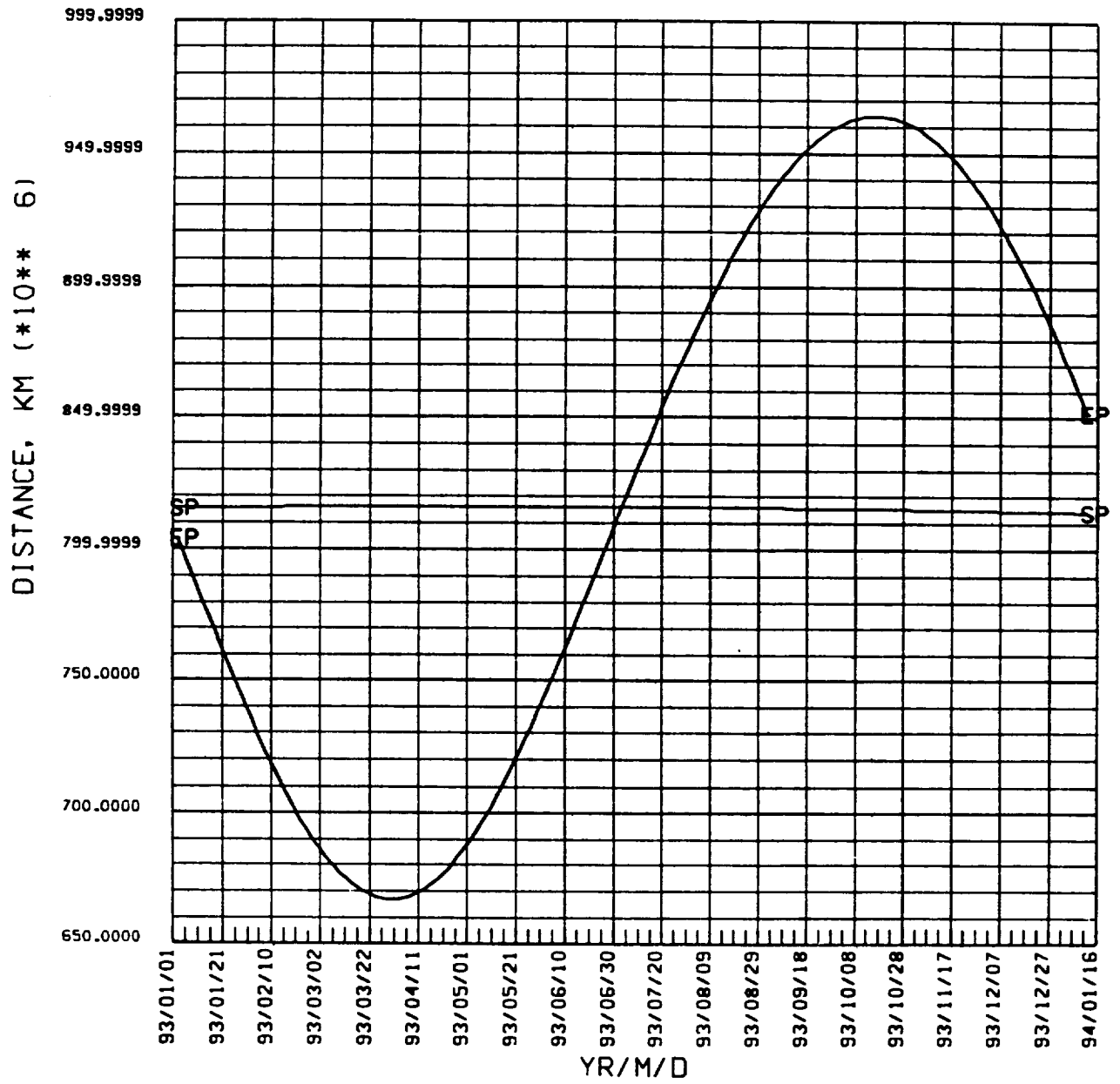
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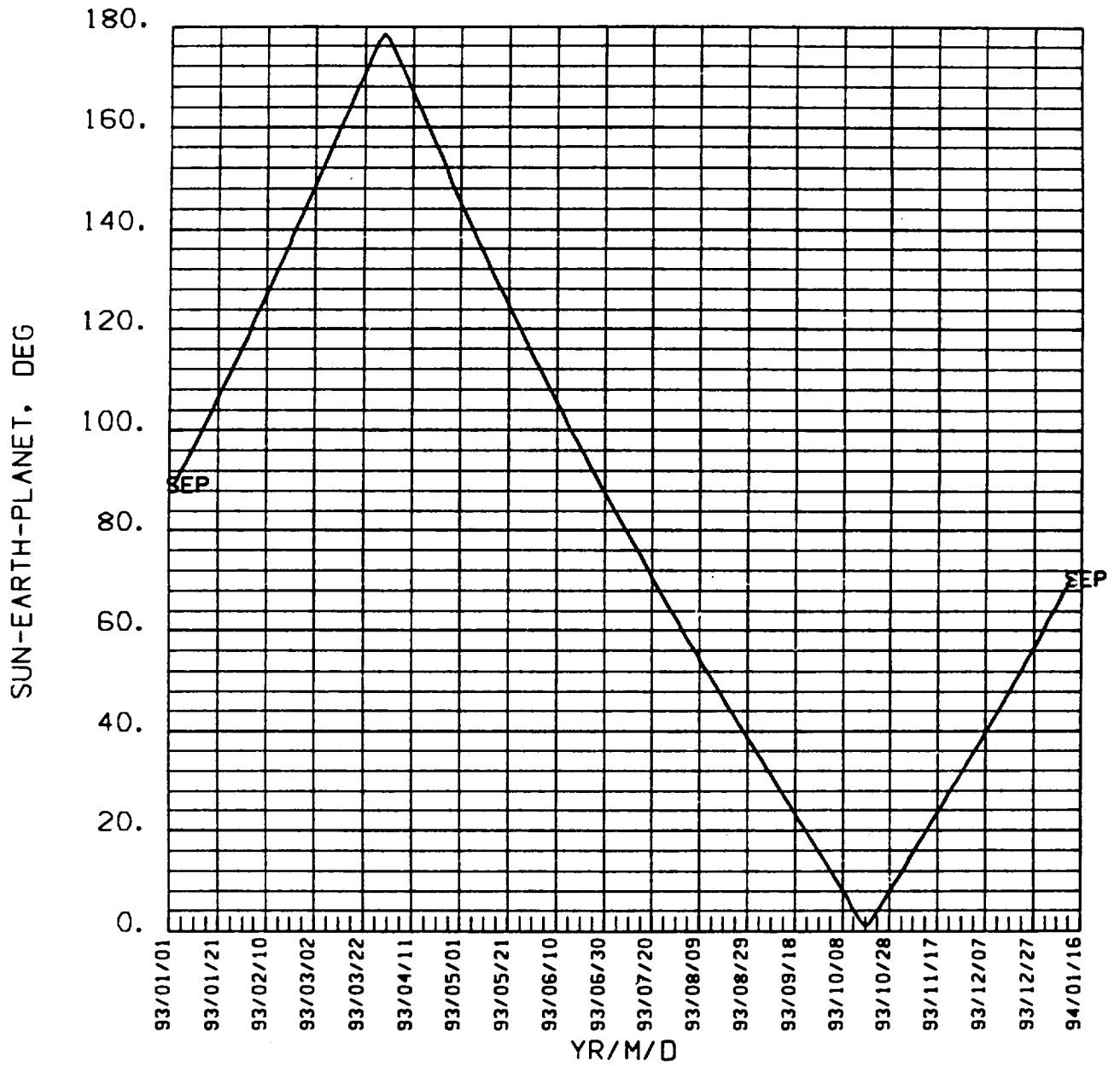
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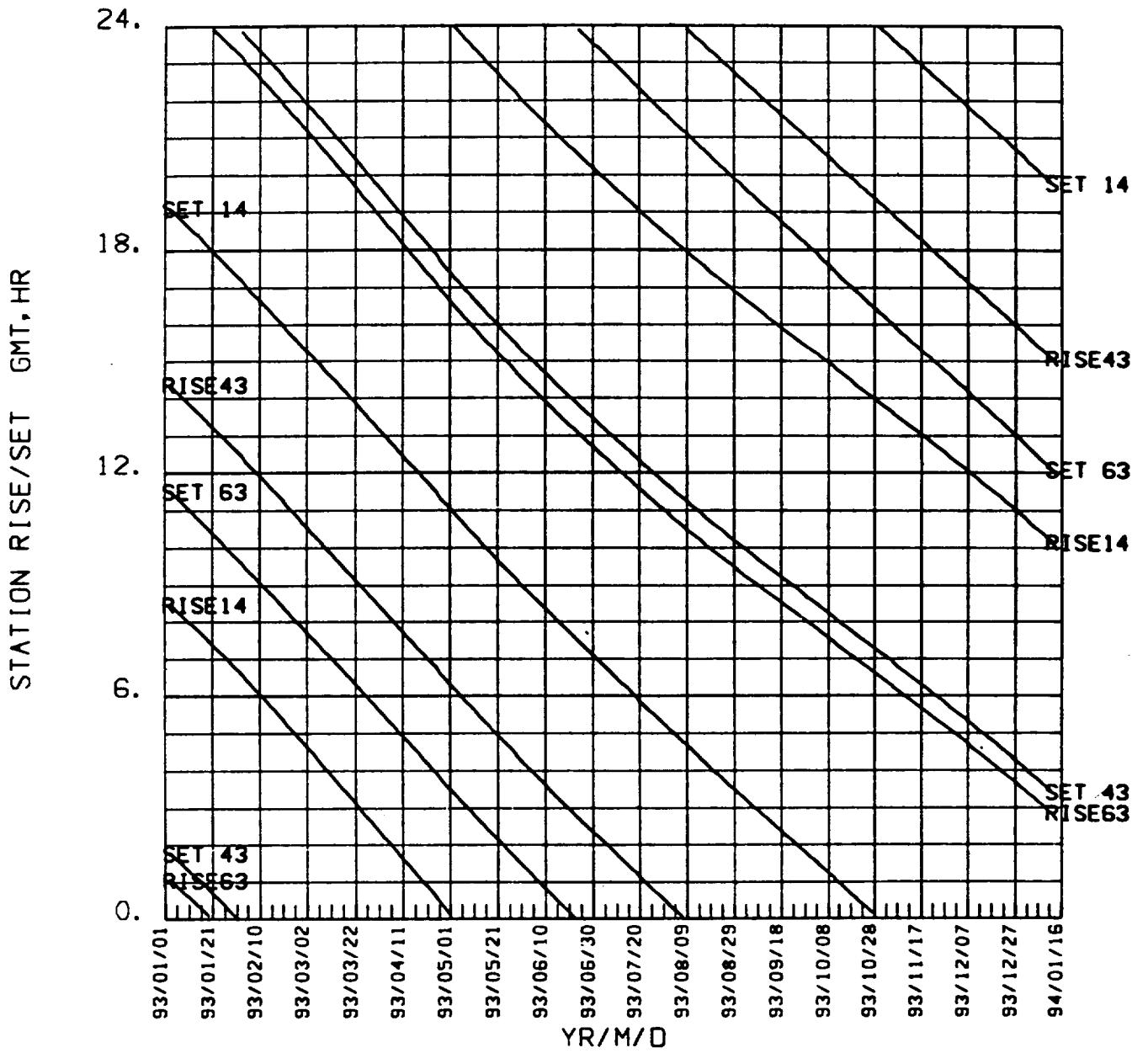
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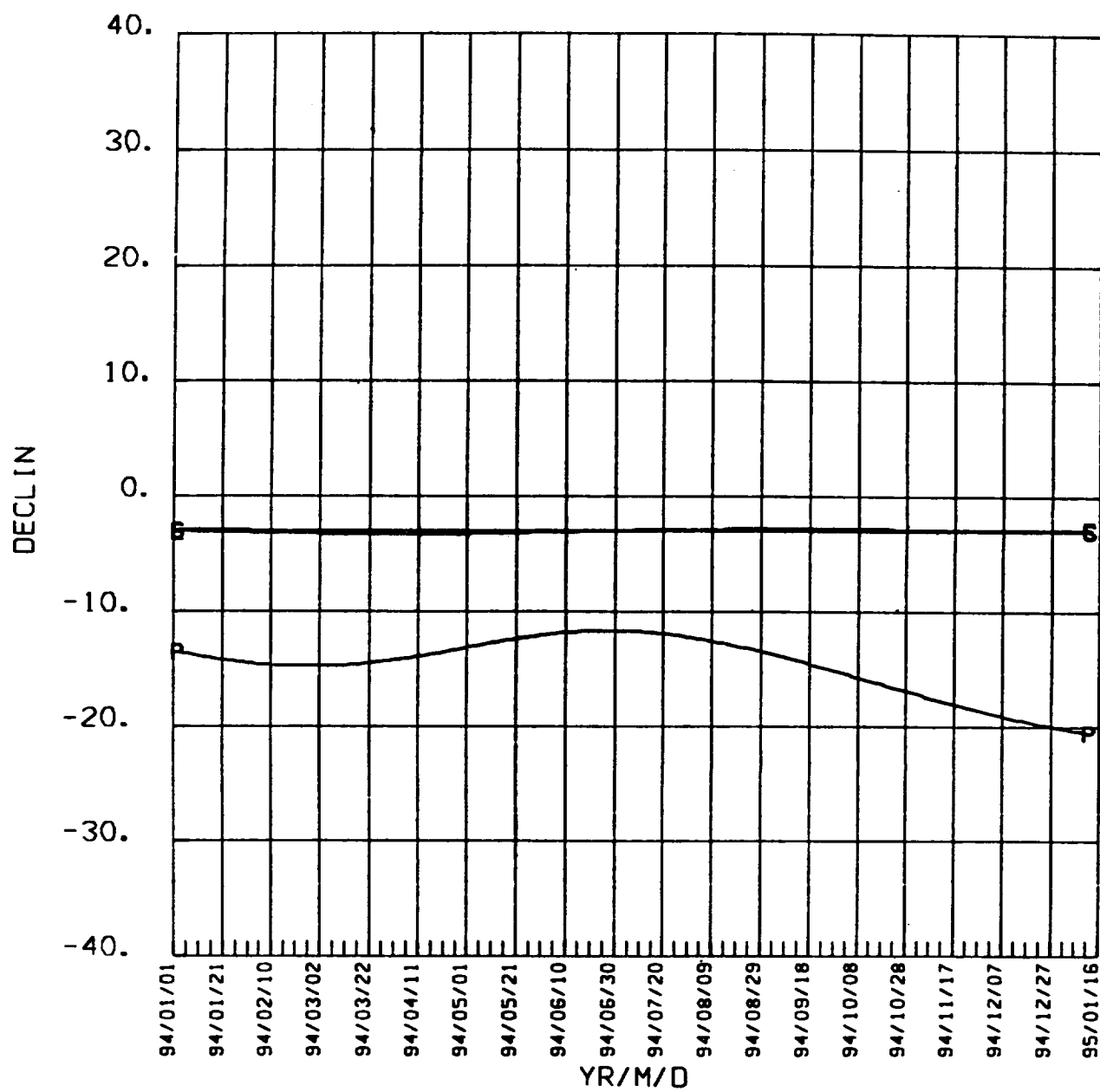
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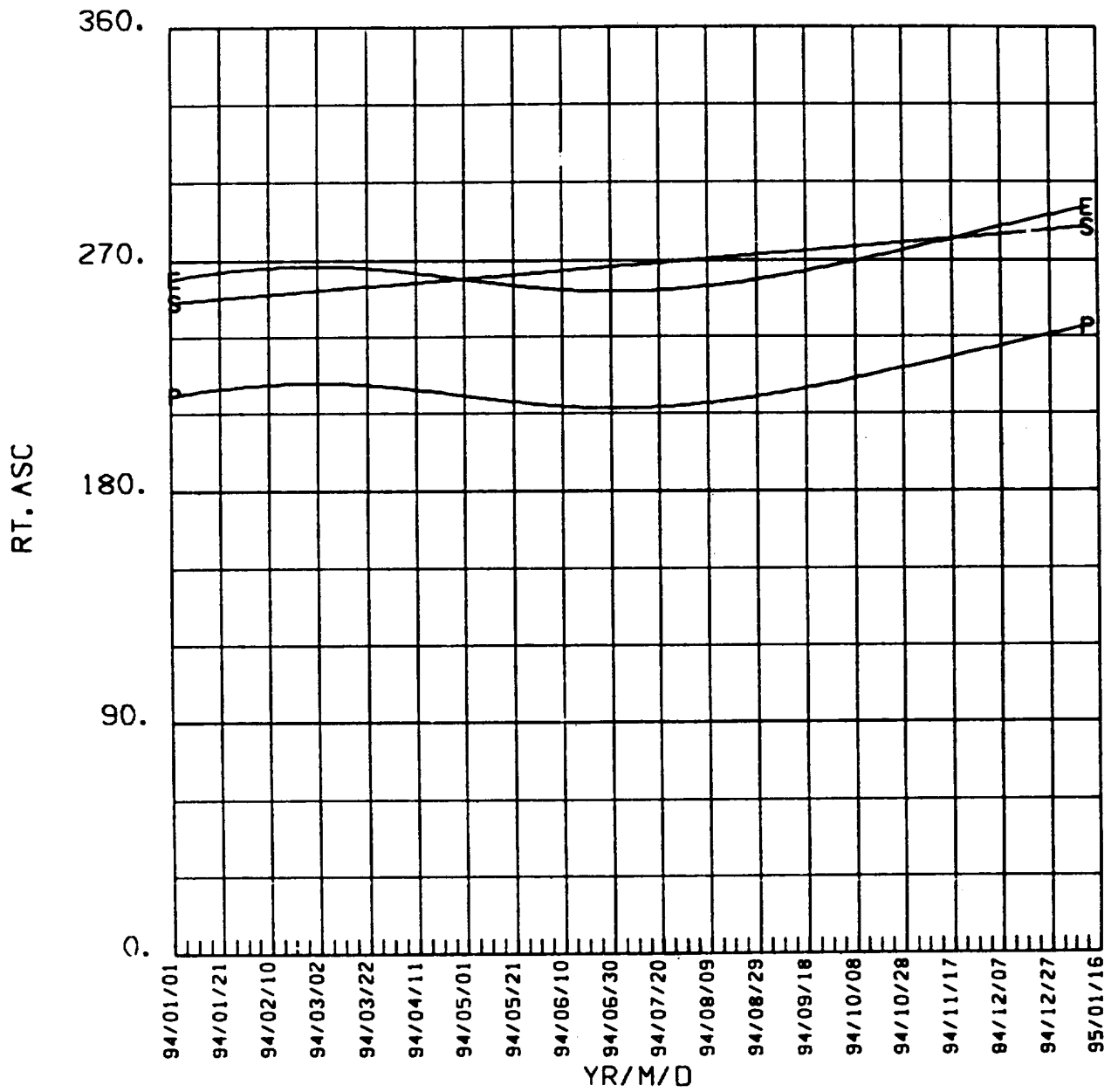
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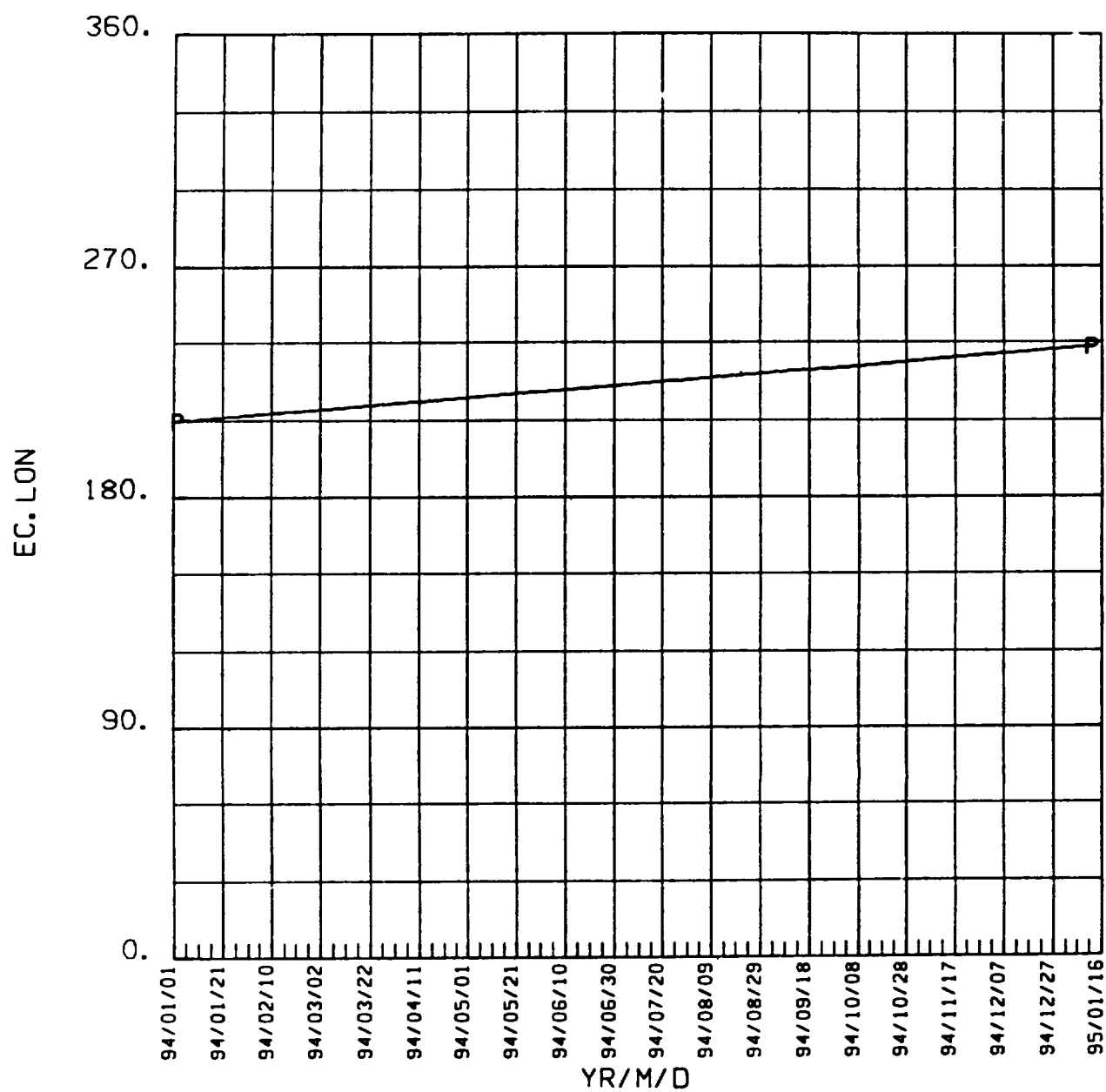


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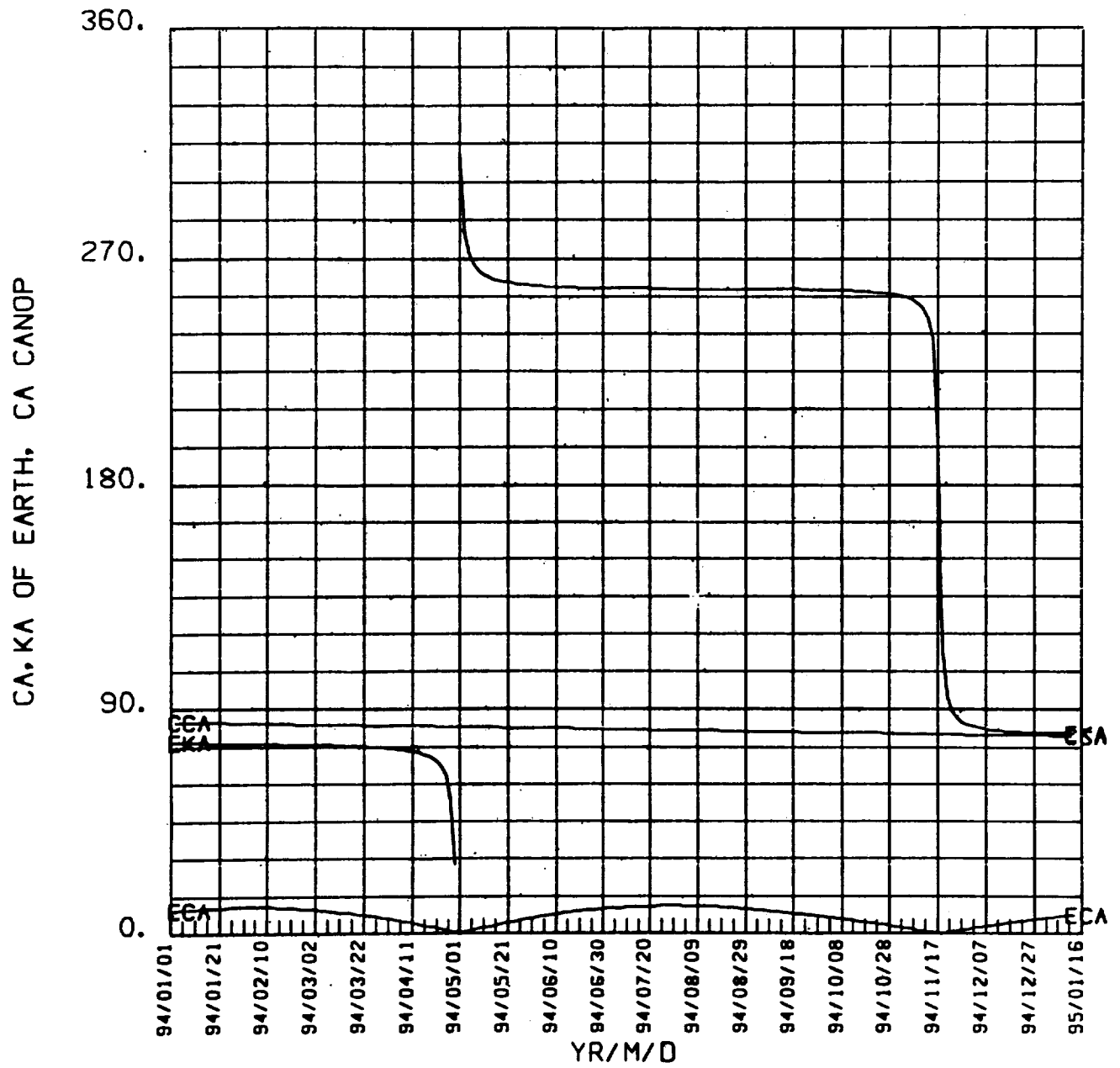




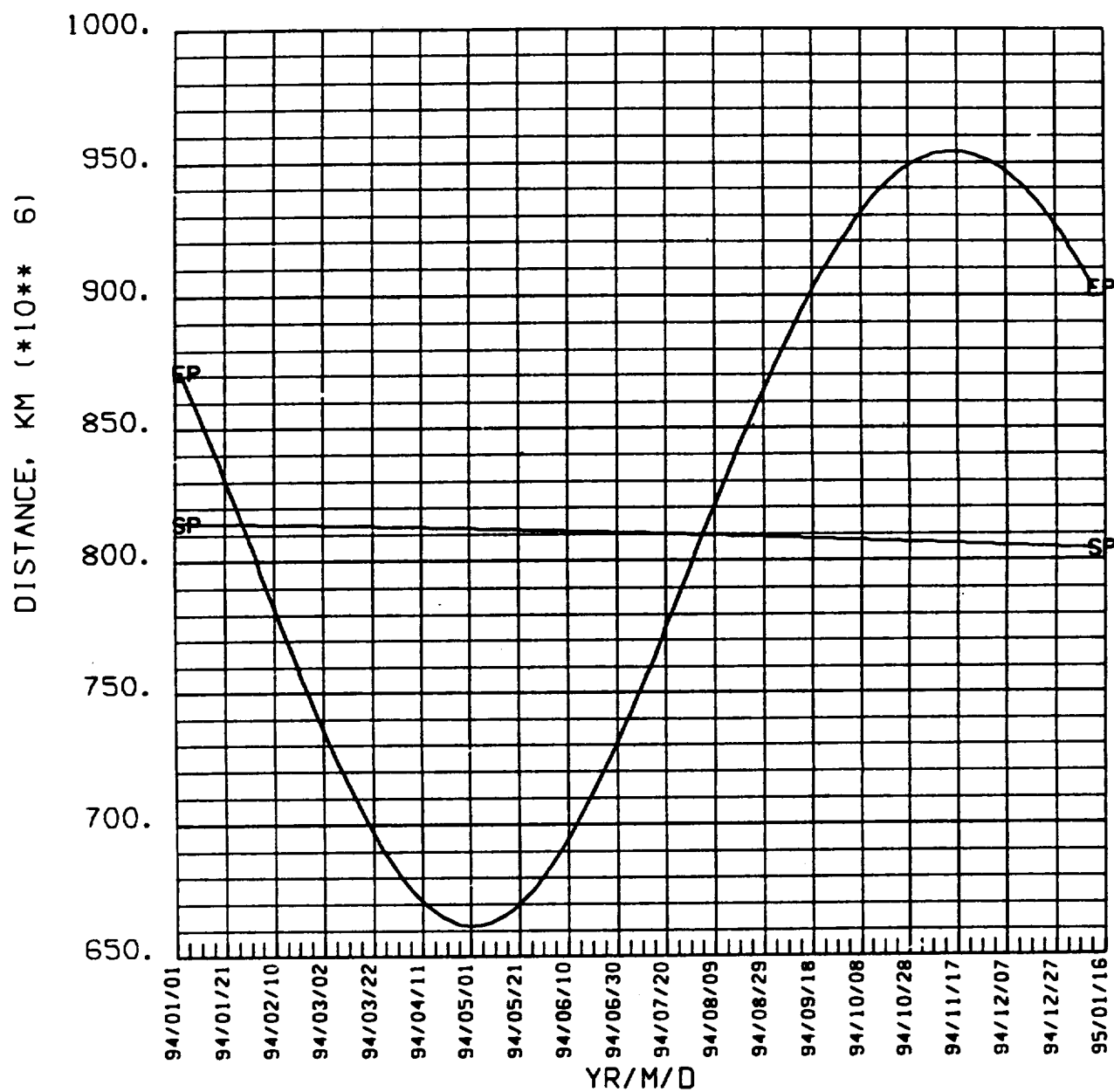
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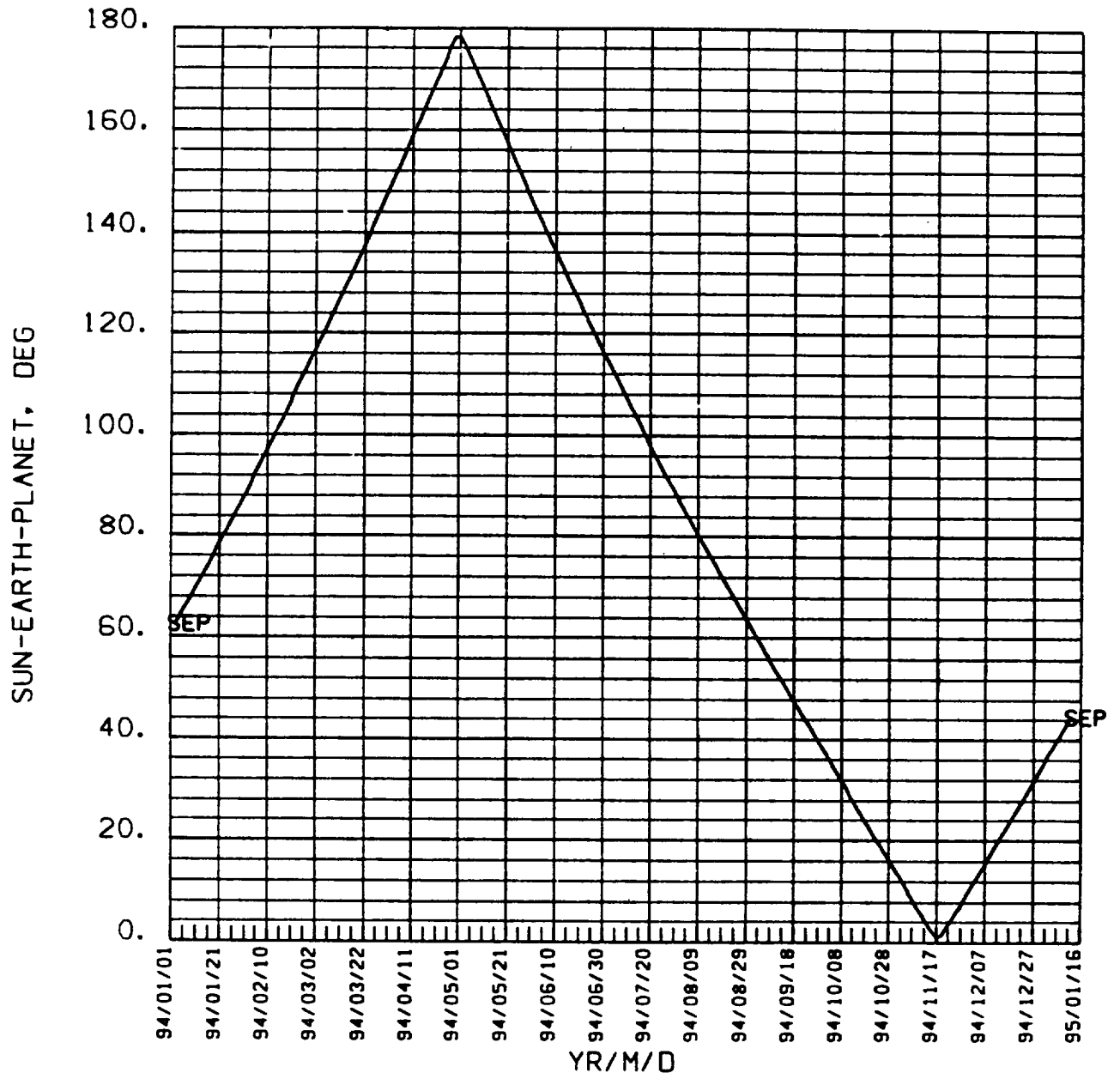
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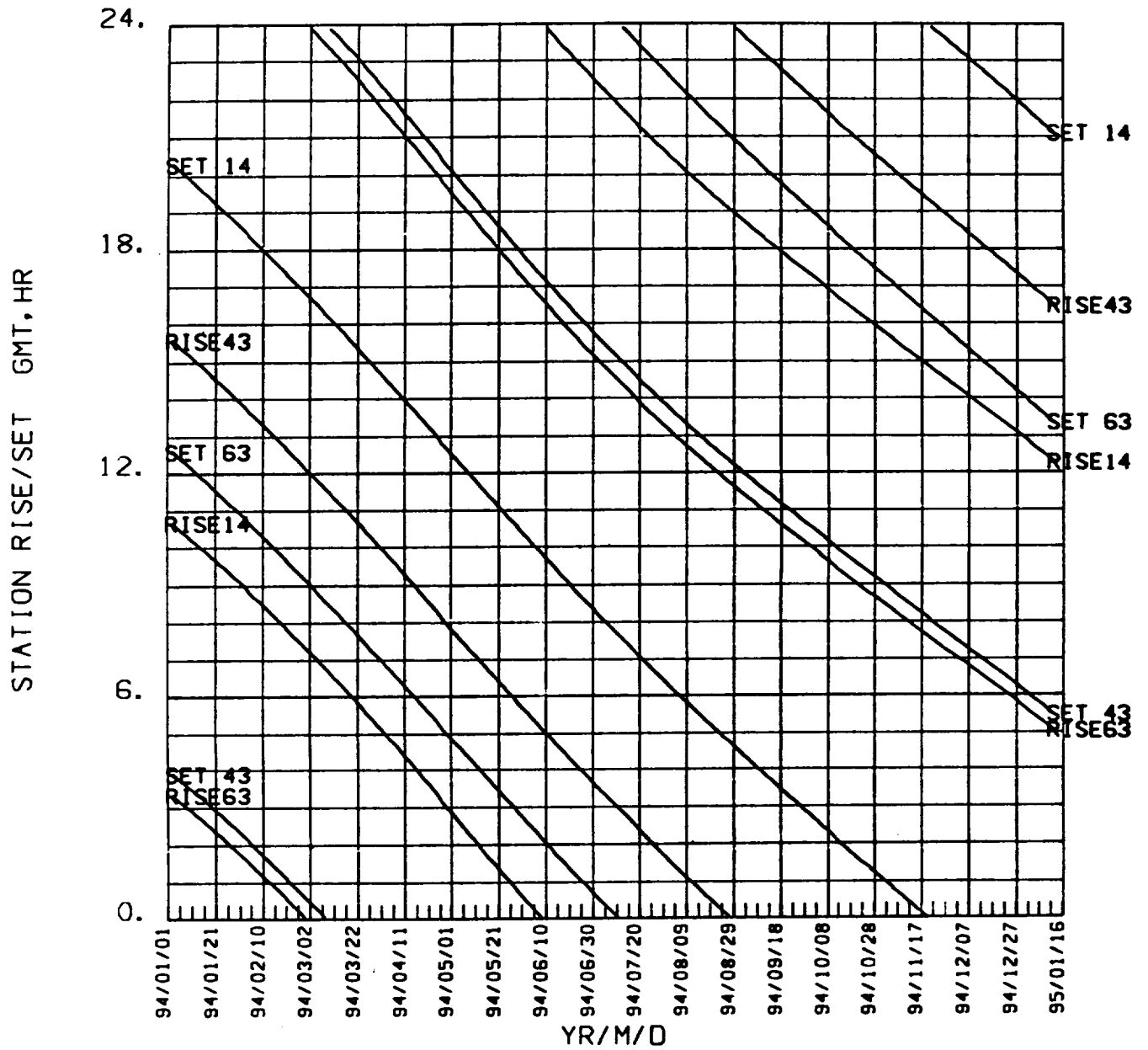
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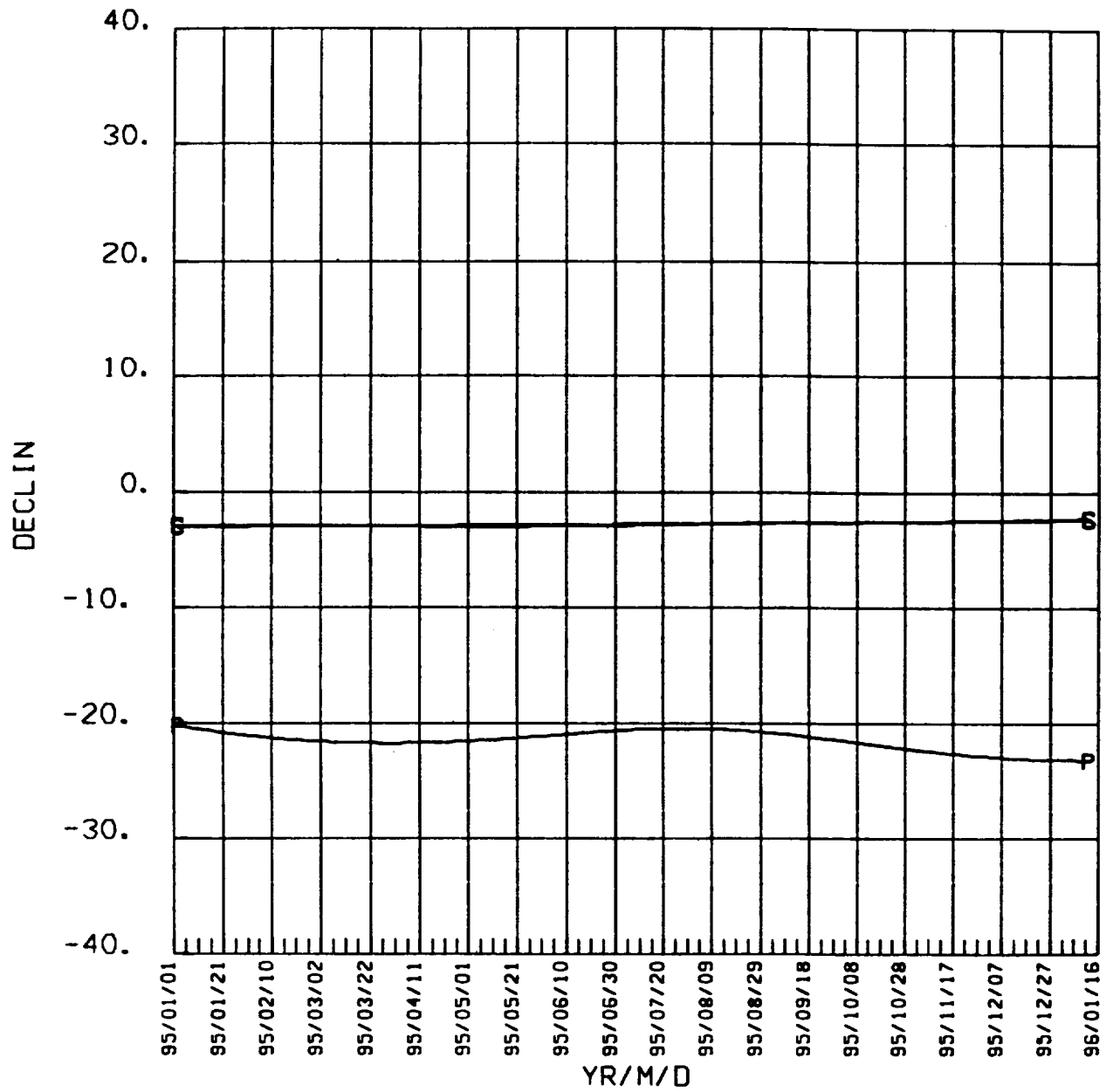
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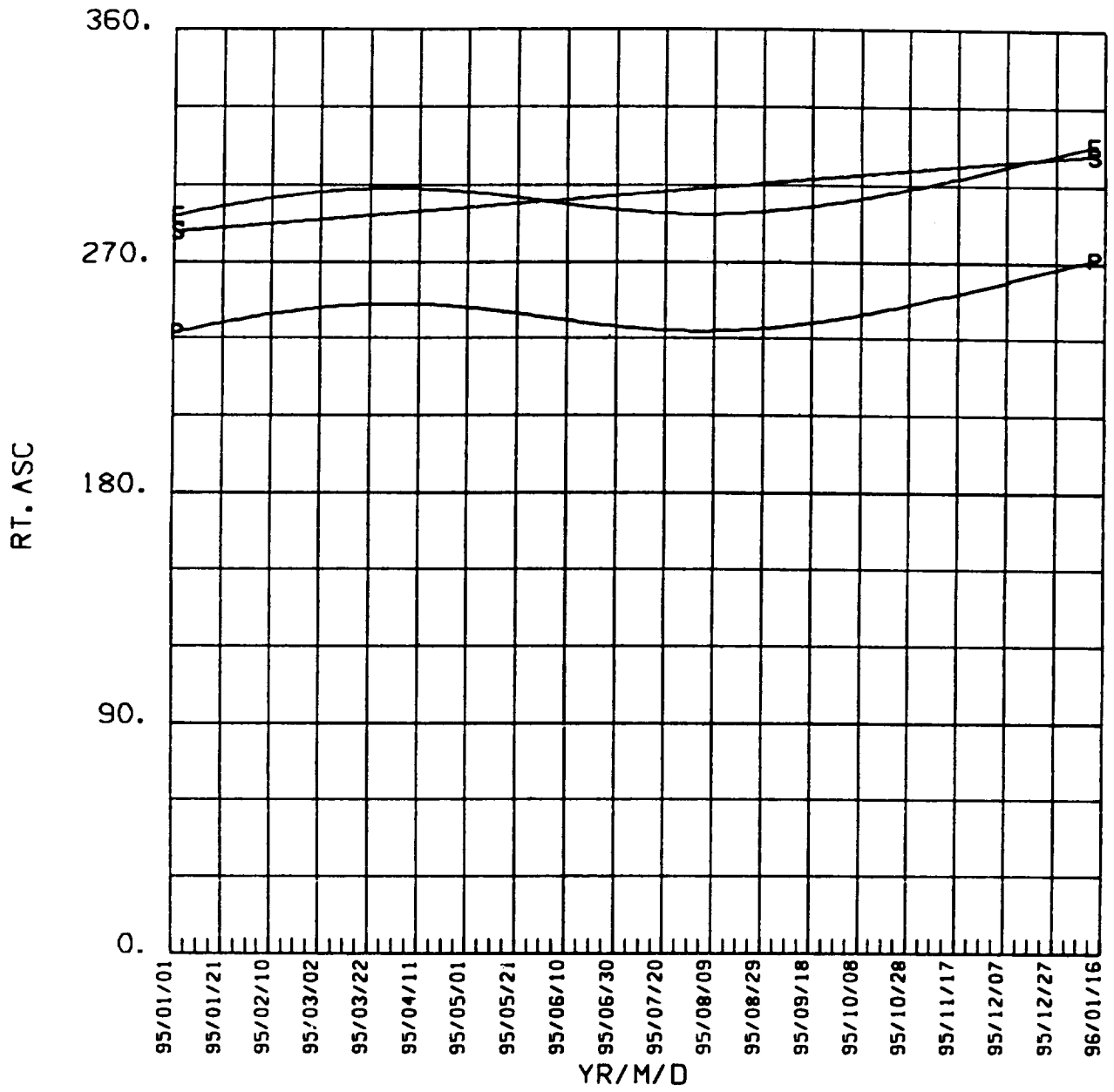
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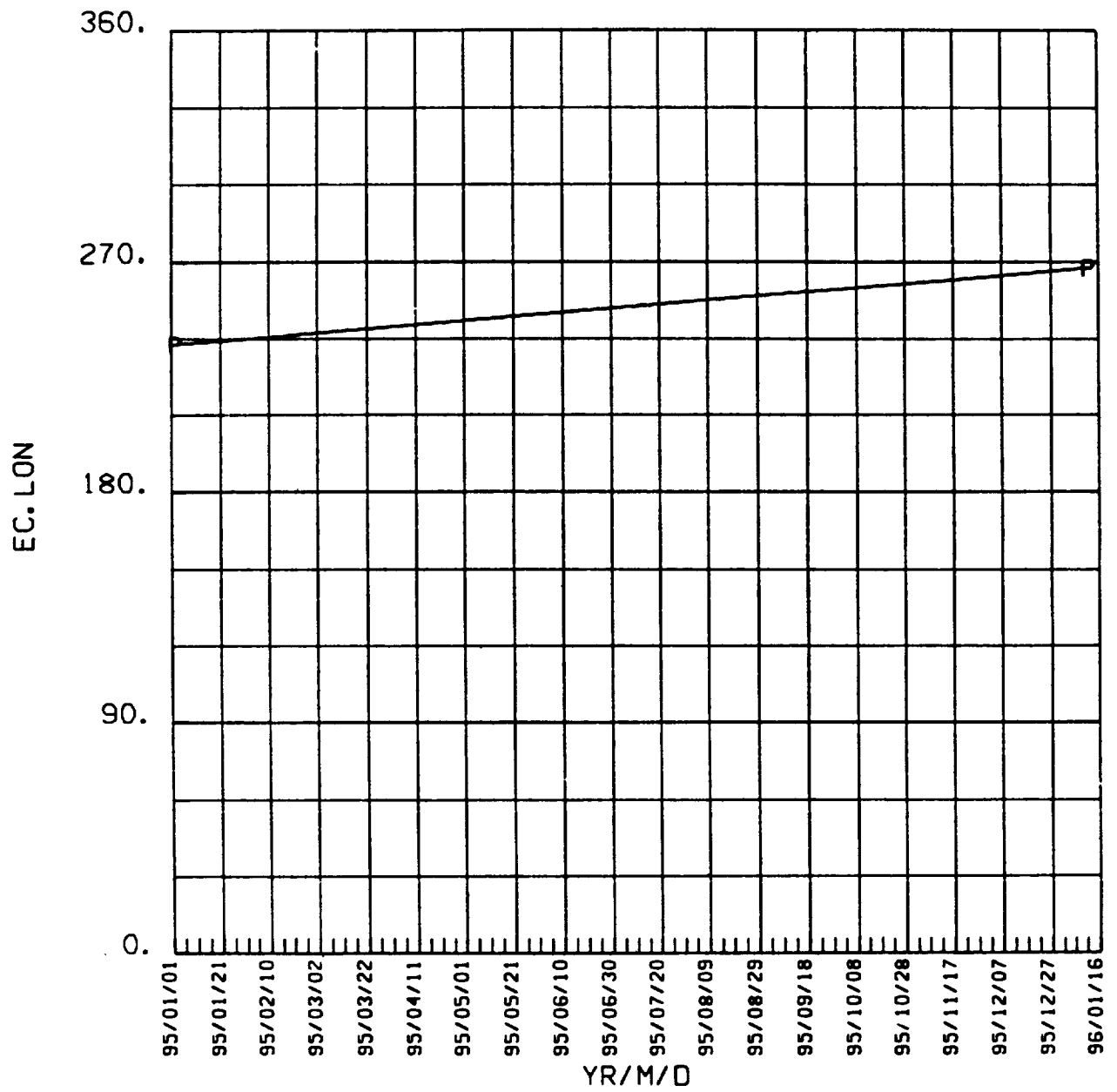
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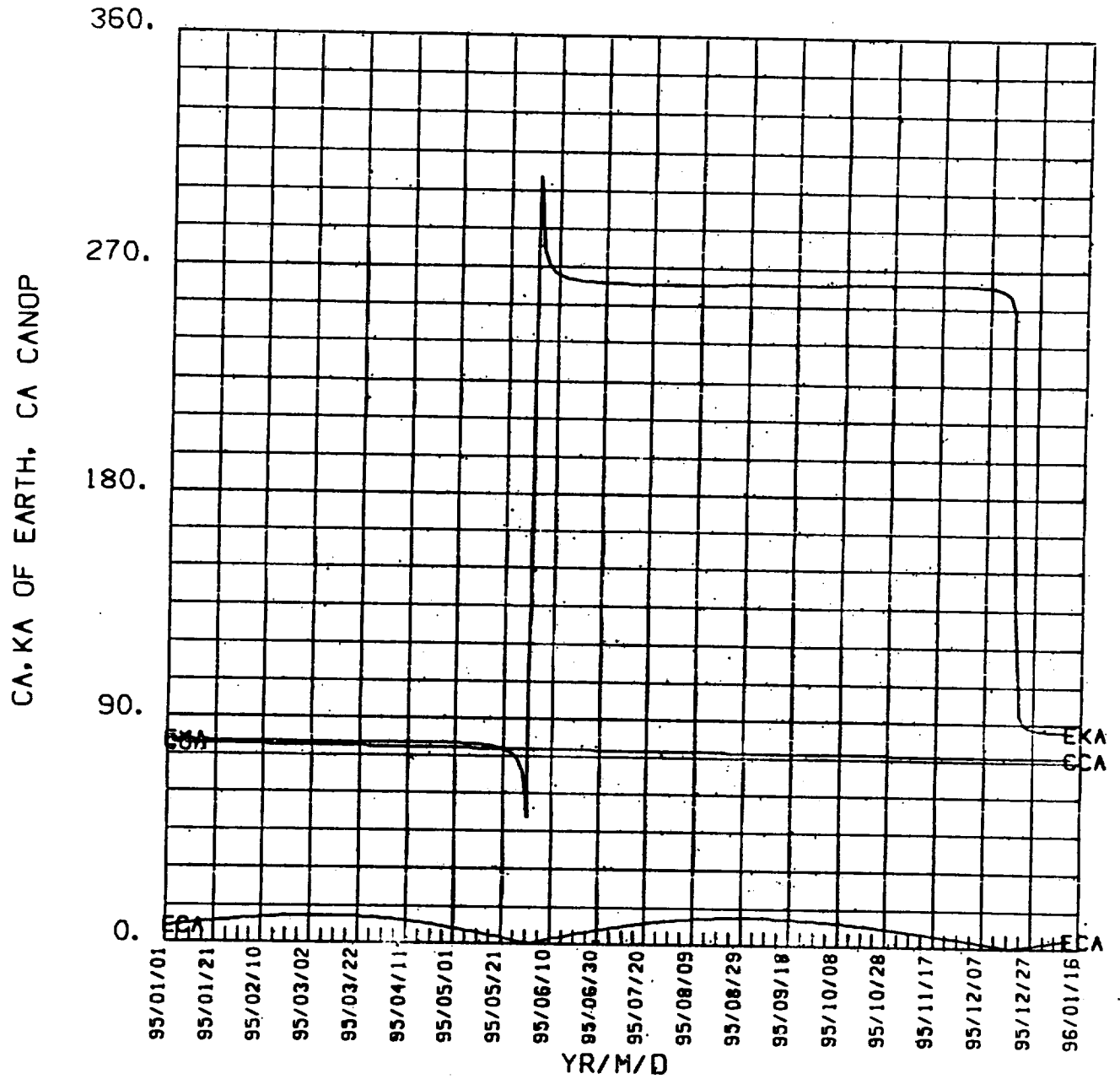


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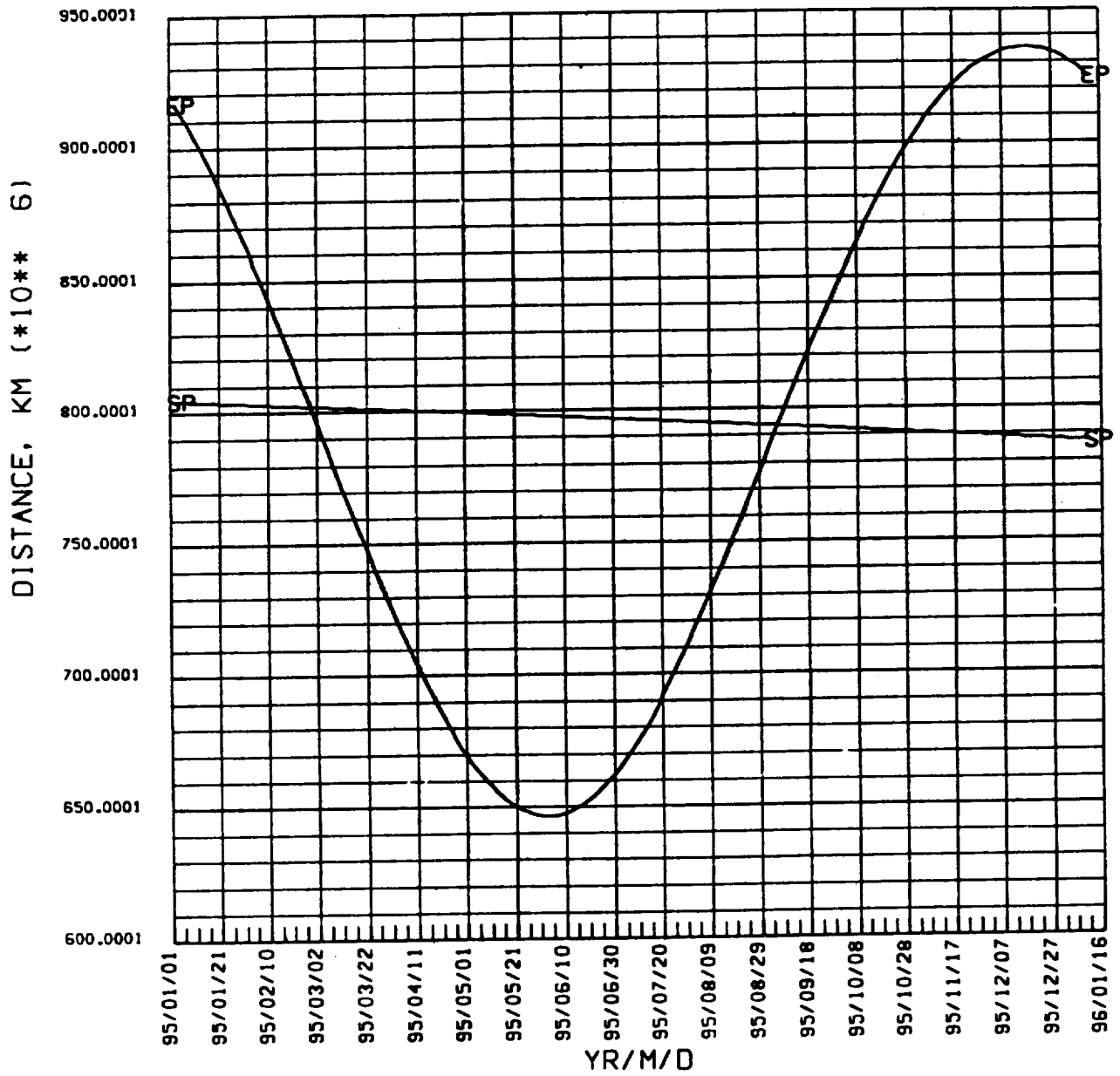




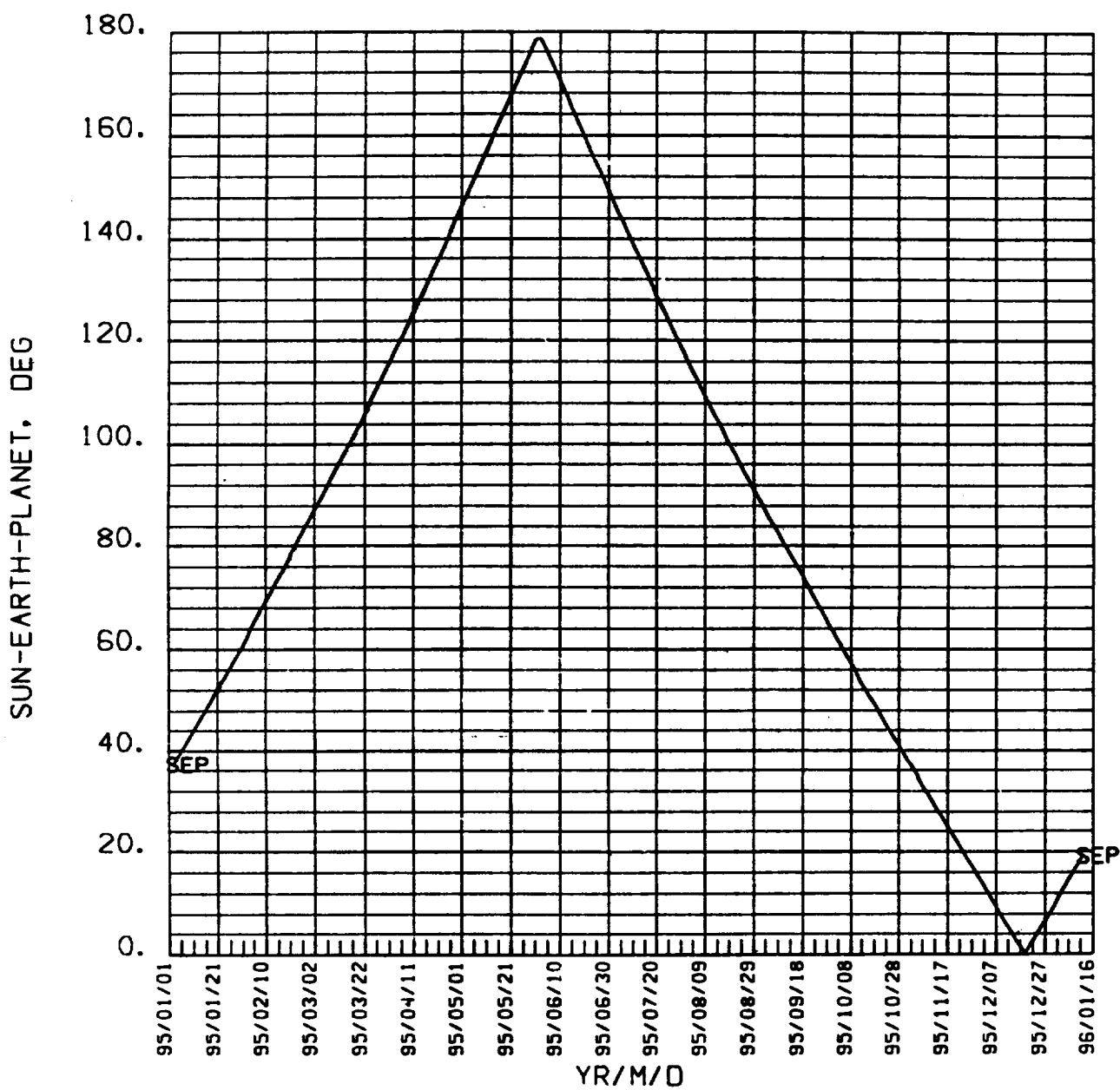
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